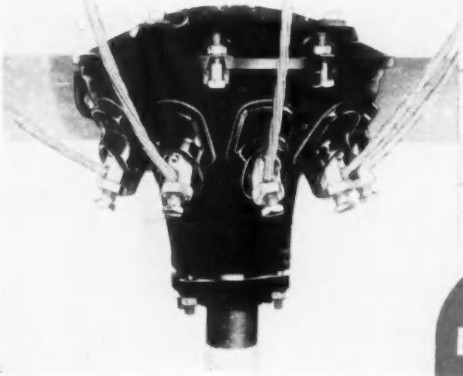
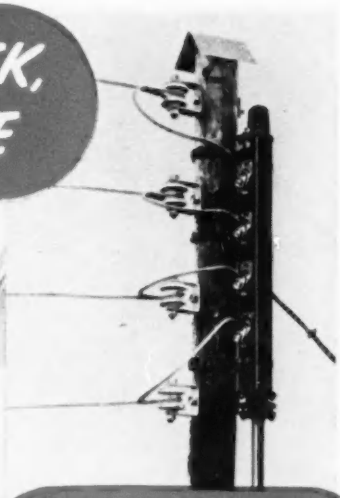
ELECTRICAL TIMES

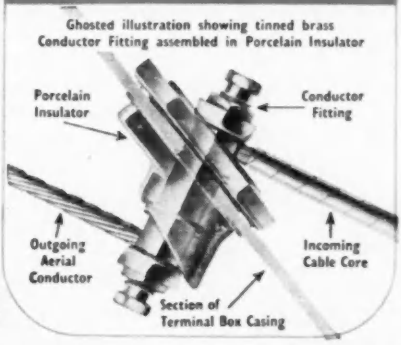
THURSDAY
3 SEPT.
1953
NINEPENCE

JOINTING IS QUICK, SIMPLE, RELIABLE





Note this
EASY JOINTING FEATURE


Ghosted illustration showing tinned brass Conductor Fitting assembled in Porcelain Insulator
Porcelain Insulator
Conductor Fitting
Outgoing Aerial Conductor
Incoming Cable Core
Section of Terminal Box Casing

HENLEY low tension terminal boxes for pole mounting include: TIER TYPE for line conductors arranged in vertical formation, and INVERTED TYPE for conductors arranged in horizontal or similar formation.

Please write for Catalogue 50, giving full details of the complete range.

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OUTDOOR TERMINAL BOXES

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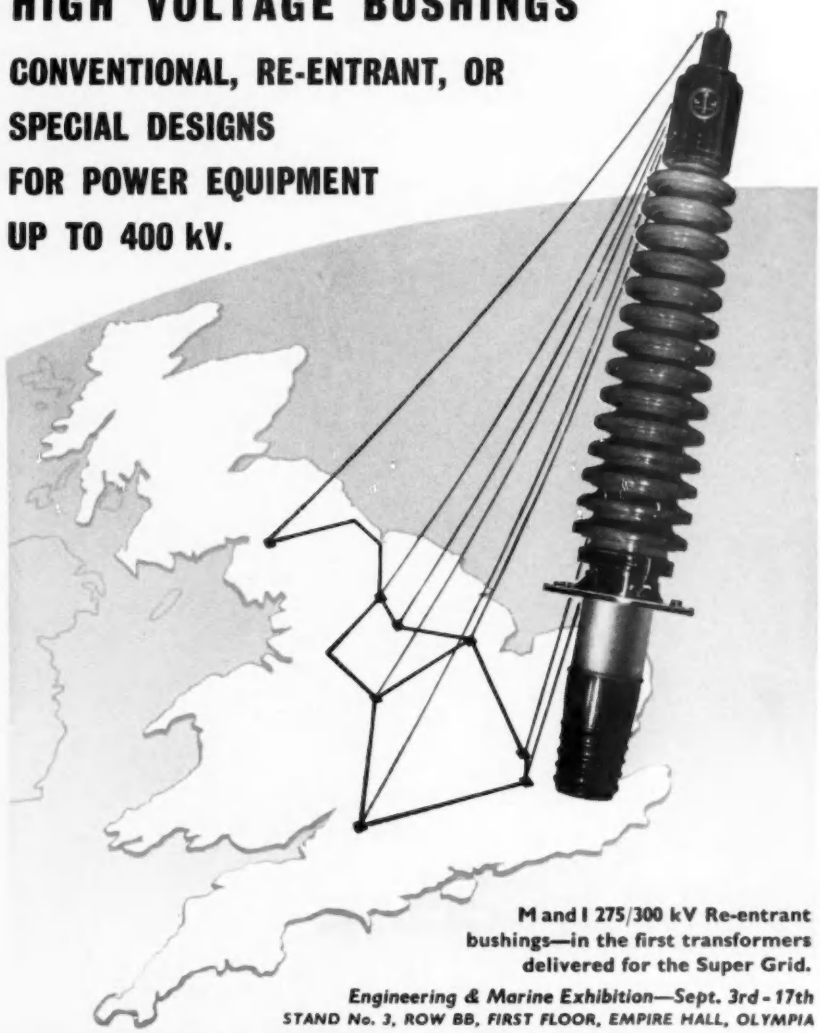
CONVENTIONAL, RE-ENTRANT, OR SPECIAL DESIGNS FOR POWER EQUIPMENT UP TO 400 kV.



M and I 275/300 kV Re-entrant bushings—in the first transformers delivered for the Super Grid.

Engineering & Marine Exhibition—Sept. 3rd - 17th

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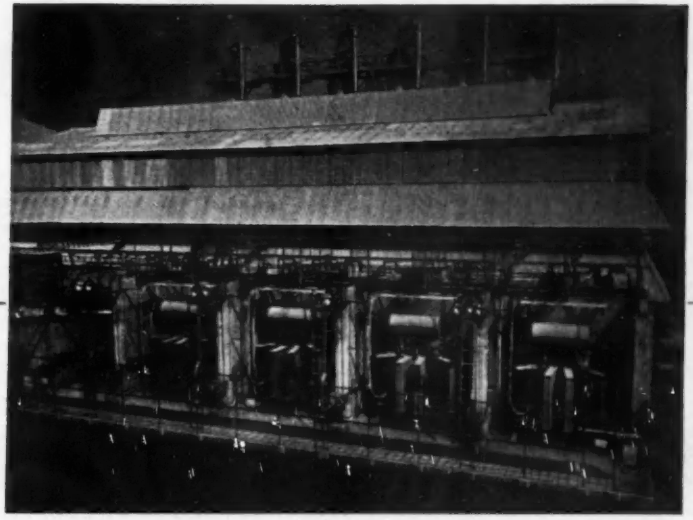
Transformers for the Sindri Fertiliser Factory India



'ENGLISH ELECTRIC' were privileged to supply electrical equipment to the Government of India Fertiliser Factory at Sindri, Bihar.
The illustration shows four 7,000 kVA, 11,000/3,300 volts and one 1,250 kVA, 11,000/400 volts, 3-phase, transformers in one of the substations at this factory. For this installation a total of thirty-eight transformers, aggregating 90,750 kVA, were supplied.
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and now occupy entirely new factory four times larger than before. This means bigger production and speedier deliveries. Now is your opportunity to create goodwill with your customers. STOCK and SELL WARM-GLOW.

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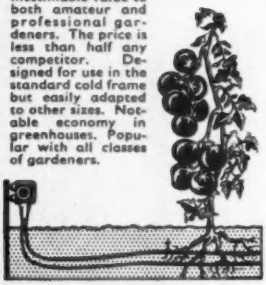

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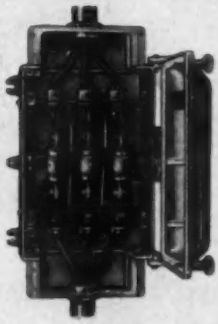

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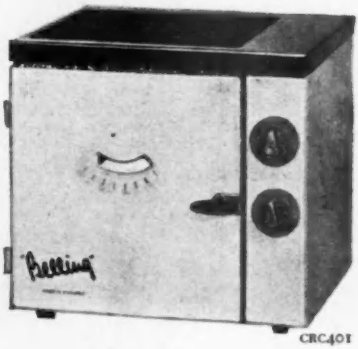

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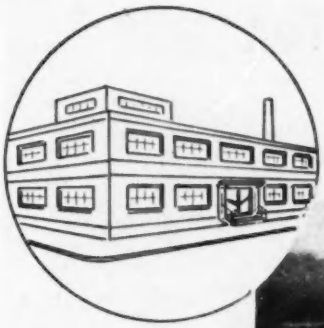
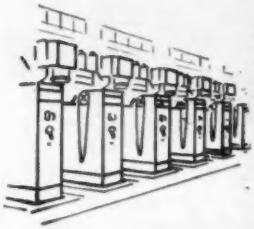


What would this mean to you?



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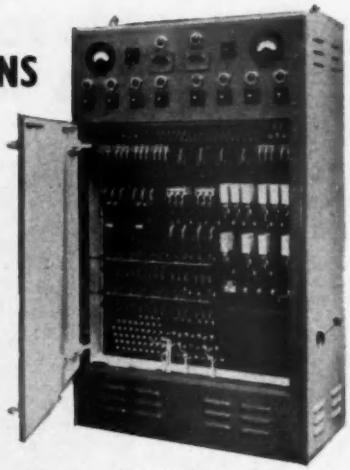

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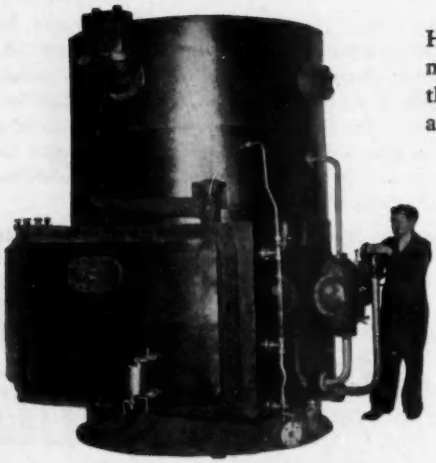

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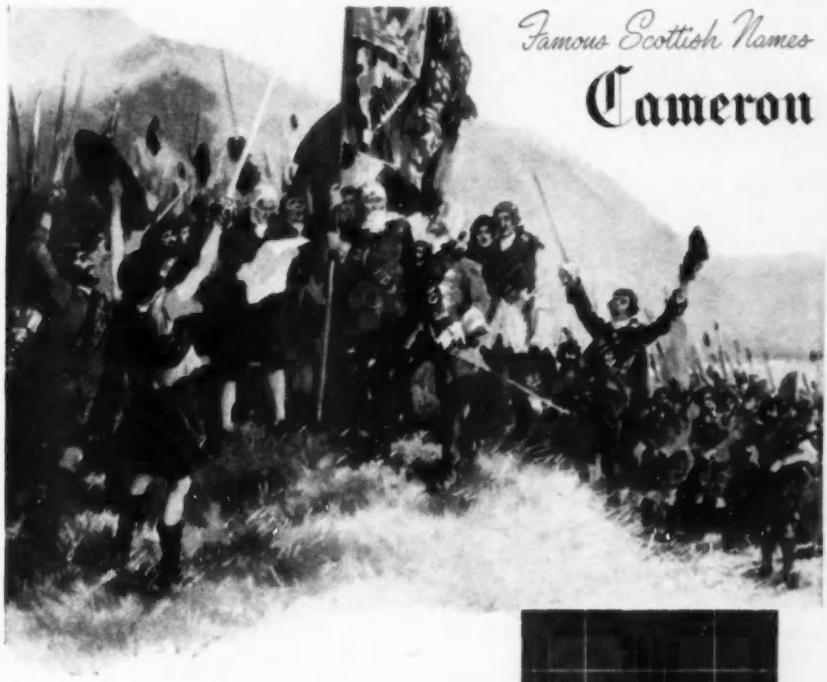

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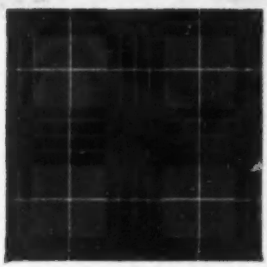

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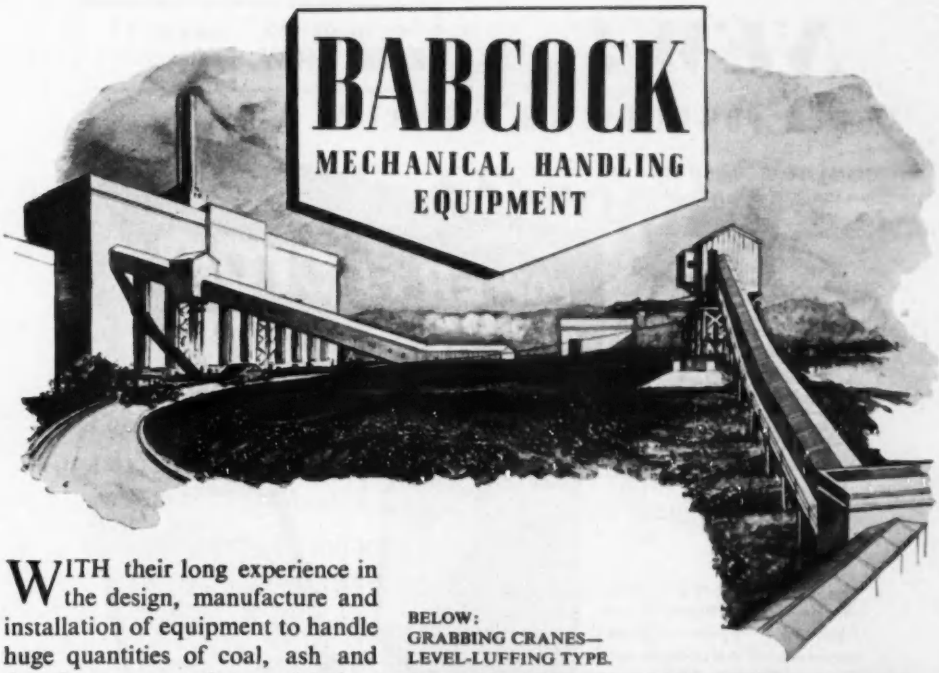

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The Unit will only operate with a Model '7' or a Model '40' AvoMeter fitted with sockets marked "P.F." For some time past, instruments leaving the factory have been fitted with these sockets, but earlier models not so fitted can be modified by us for £3:5:0, plus the cost of any repairs, should they be necessary.

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£10

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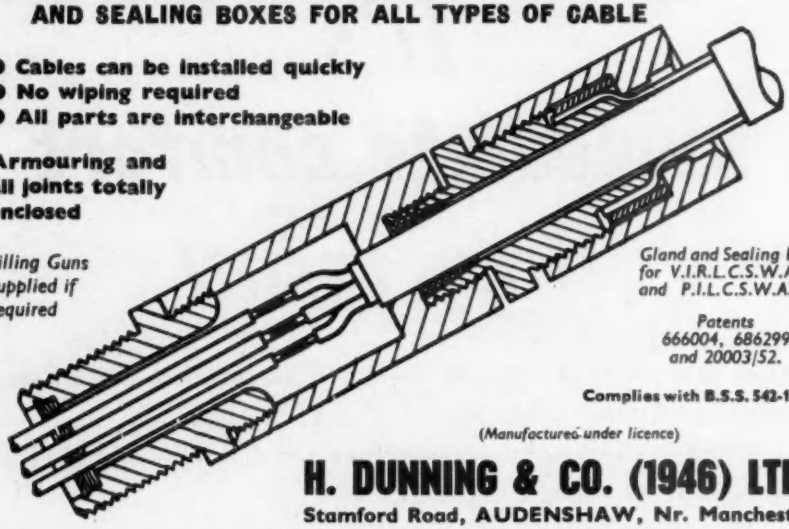

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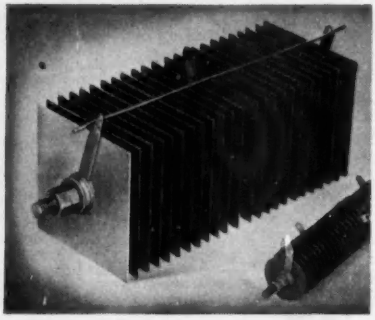

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(Also for indoor use)

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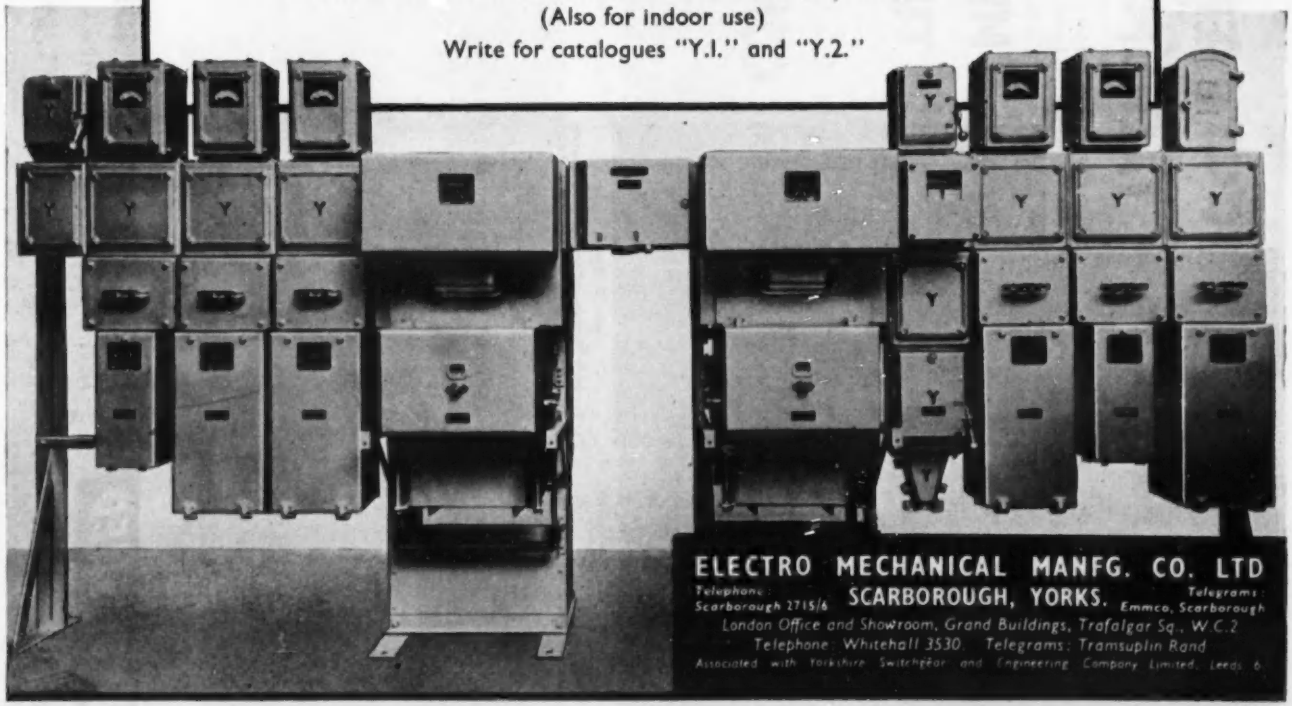

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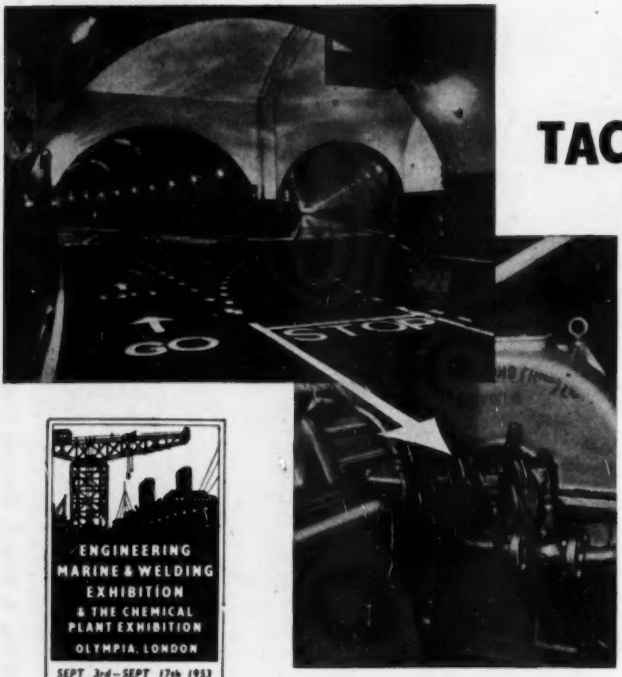

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STAND No. 5, ROW Q

The Evershed Tachometer coupled to the driving shaft of a ventilation fan in the Mersey Tunnel

To keep the air in the Mersey Tunnel free of carbon monoxide the Mersey Tunnel Joint Committee built six ventilating stations to house a tunnel ventilating system comprising 30 fans of various impeller diameters of up to 28 feet.

Evershed Tachometers coupled to the drive shafts of the fans, transmit, in some cases over a distance of two miles, to a control room a true indication of the fans under working conditions.

The above is just another instance of the use of Evershed Tachometers for indicating and recording at a distance.

They are described in Publication No. J224.

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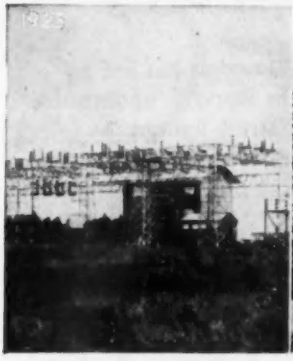
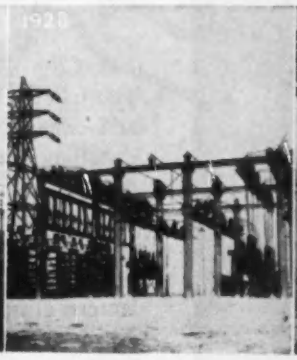
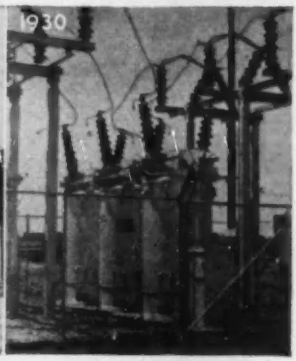


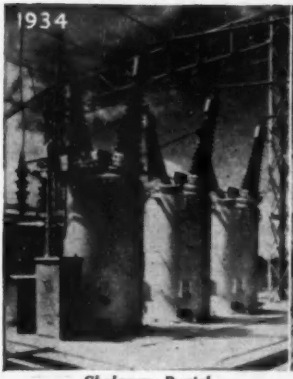
Bunnythorpe, New Zealand



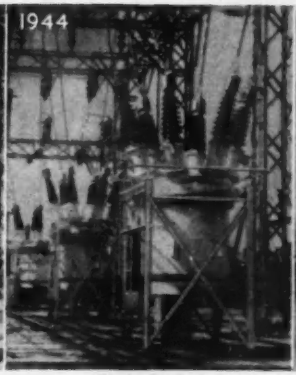
Singu, Burma



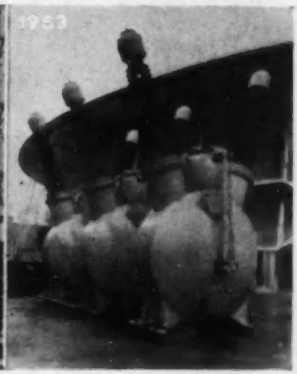
Klerksdorp, South Africa



Shalamar, Punjab



Erode, Madras



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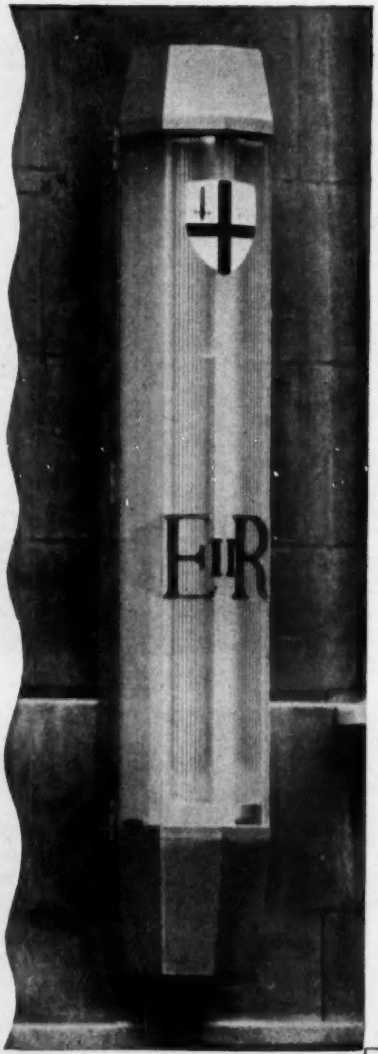

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The City of London has set an example to the world in unobtrusive and efficient street lighting by installing the new Siemens vertical fluorescent lanterns. These lanterns have covers of 'Perspex' acrylic sheet incorporating a specially designed refracting system. The lantern illustrated is one of those now installed in historic King Street leading to the Guildhall.

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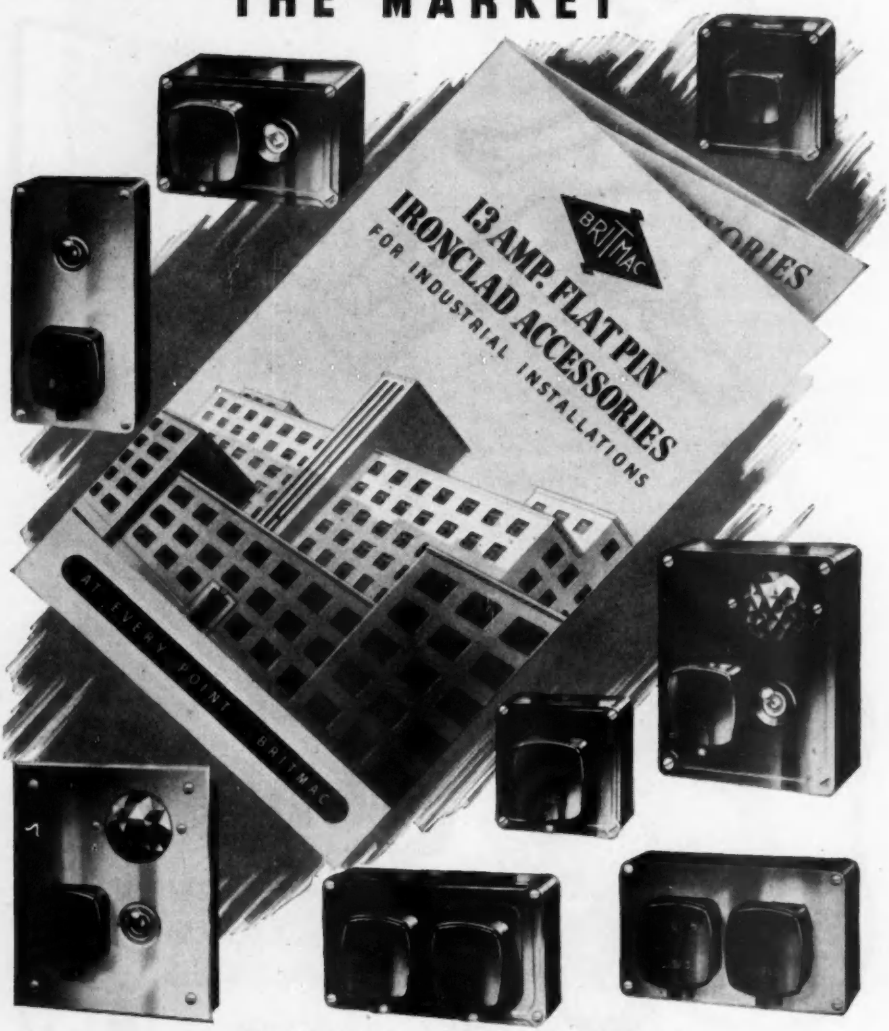

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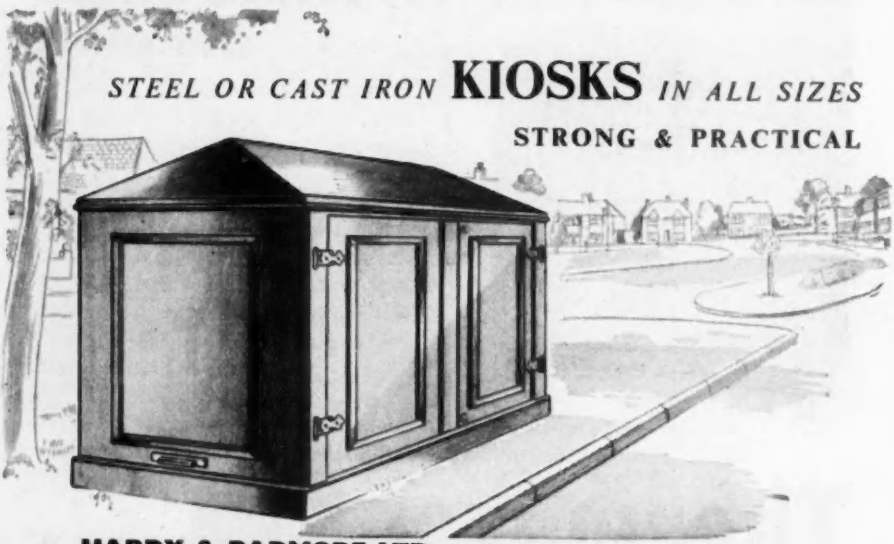

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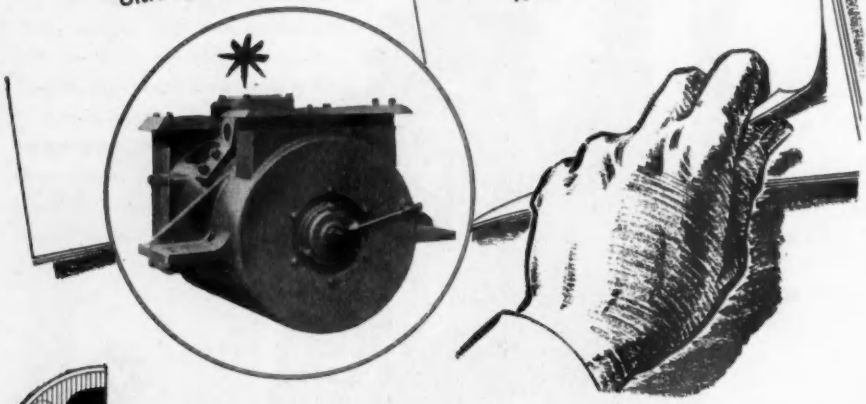
5. Variable Speed, 40:1 range, single or three phase Motors, ¼ to 5 H.P., continuously variable.
6. Frequency Changers.
7. Alternators ¼ to 60 kVA, and self-regulating up to 10 kVA.



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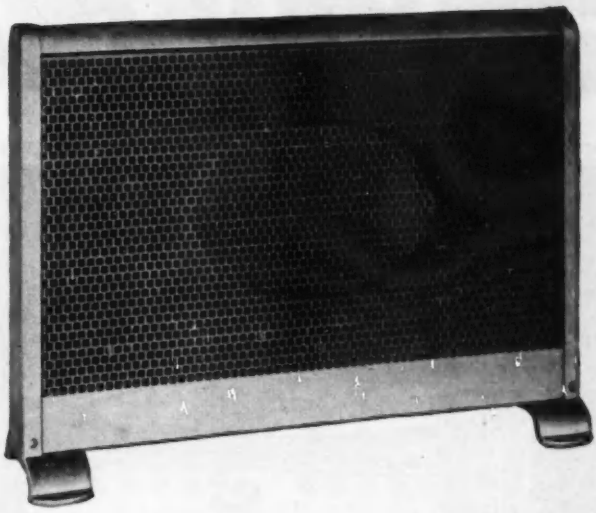

With cooler autumn evenings and the chill of winter ahead, heating sales are on the move again.

The great interest aroused by the introduction of the **RAYDAIR HEATER** earlier this year has led us to embark on a nation-wide advertising campaign for the coming season.

The **RAYDAIR HEATER** is something new; a dual-action low temperature heater which combines the advantages of a radiator with those of a convector—in one beautifully designed unit at an exceptionally low price.

This season will be a **RAYDAIR** season. Make sure your stocks are ready. And take full advantage of the press campaign by using the arresting **RAYDAIR** display material which is available for your window.

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Because... the seasoned team of Tricity specialists is backed by expanded resources and has been greatly augmented . . .

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It pays to buy QUALITY in Capacitors

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installs **BICC** CAPACITOR BANKS

The 10,500 kVAr 13.8 kV bank of BICC Capacitors illustrated above is installed at the Sarnia Substation of The Ontario Hydro. The bank is at present in a temporary position. In due course, it will be installed permanently in the same Substation. It was commissioned in July 1952. Since then, like all other BICC Capacitor Banks in Canada, it has given no trouble whatsoever.

Units are of the large tank type, each having an output of 250 kVAr. *Note how conveniently they lend themselves to either temporary or permanent outdoor installation with simple foundations, no racks, no cubicles or external fuses, and with a minimum of bushings and busbar work.*

Add to these advantages the robust construction and the special properties deriving from the high-grade, low-loss dielectric, in the manufacture of which, quality is considered before cost . . . and it will be appreciated why

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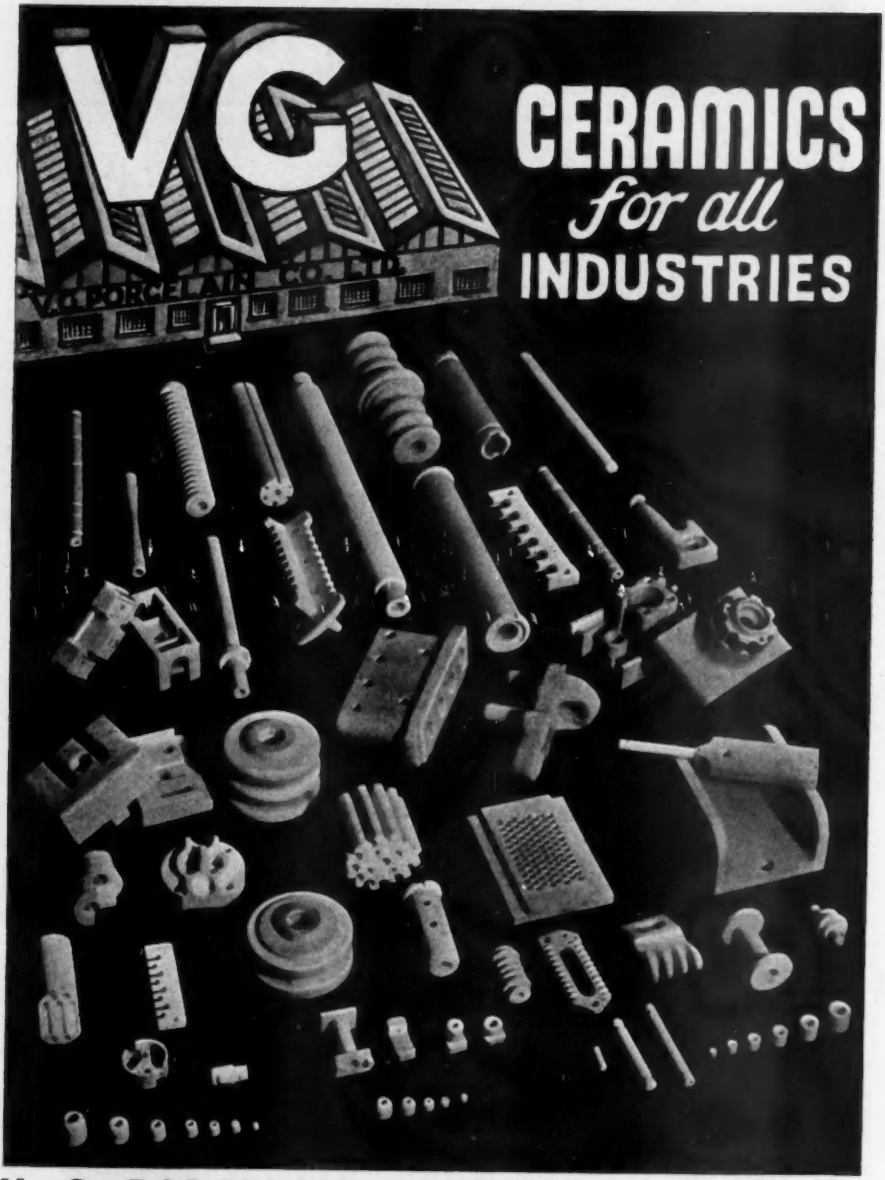

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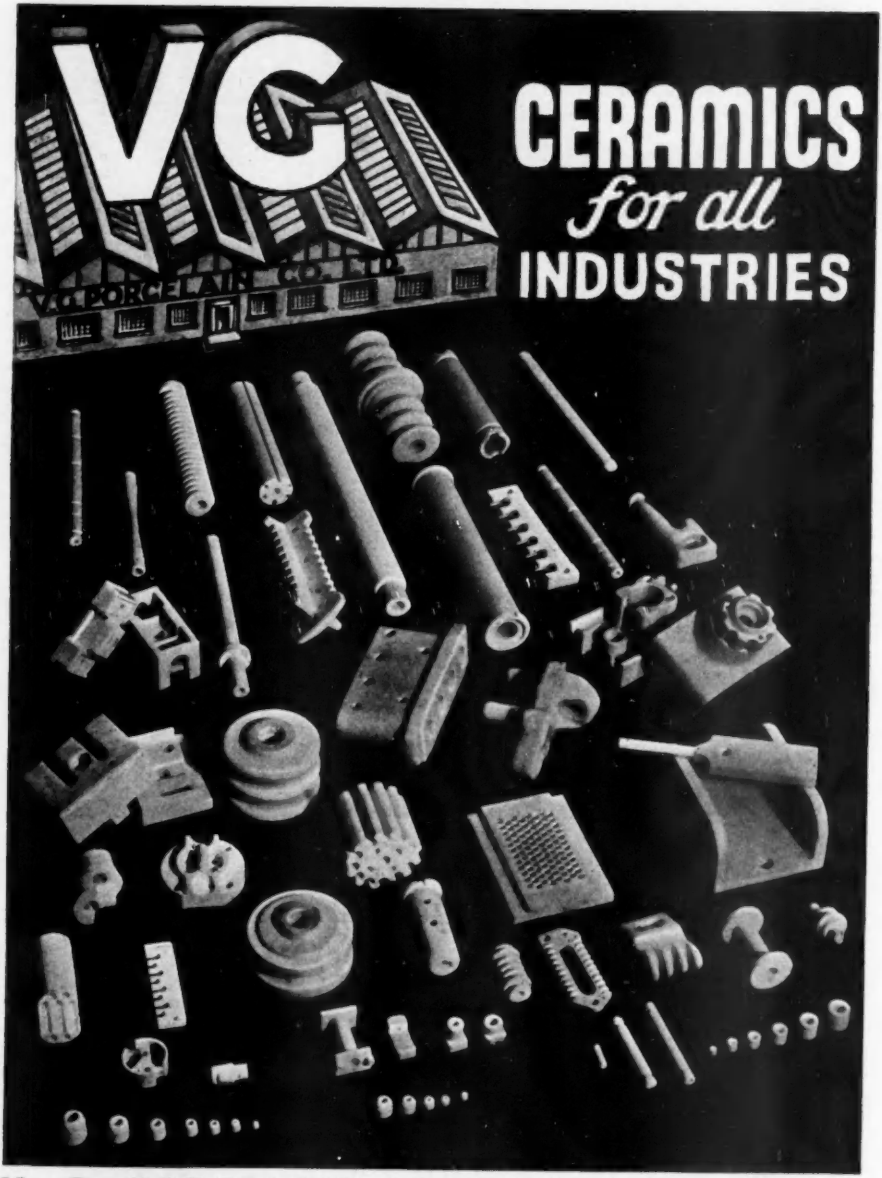

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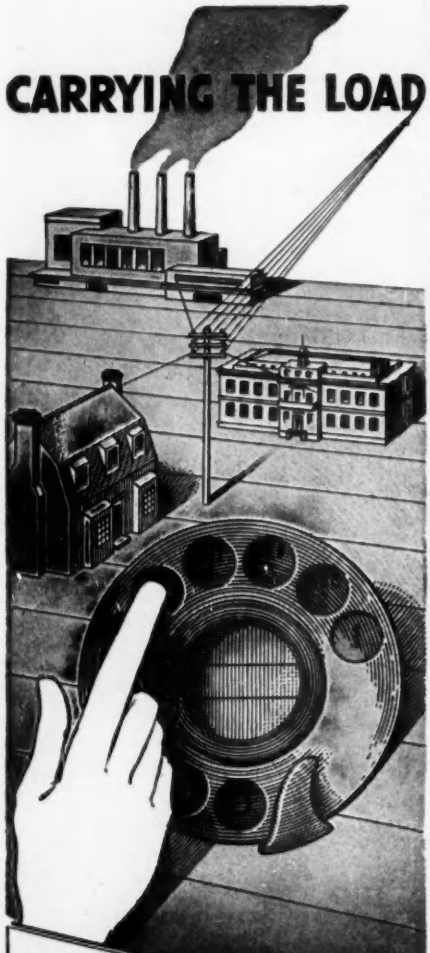

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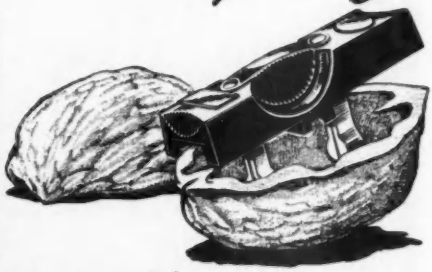

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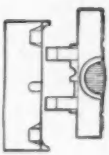

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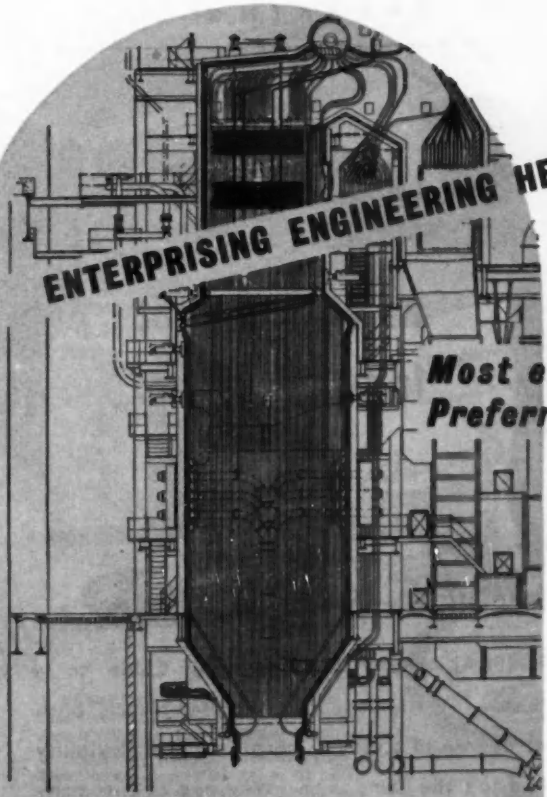

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Skelton Grange:

A thermal efficiency of 29.19% was reached in 1952 by Skelton Grange — a great contribution to the overall saving by BEA of 1,300,000 tons of coal — best performance of any 900 p.s.i. Preferred Standard station.

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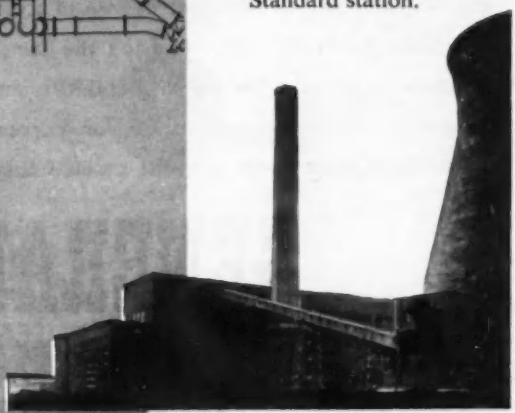

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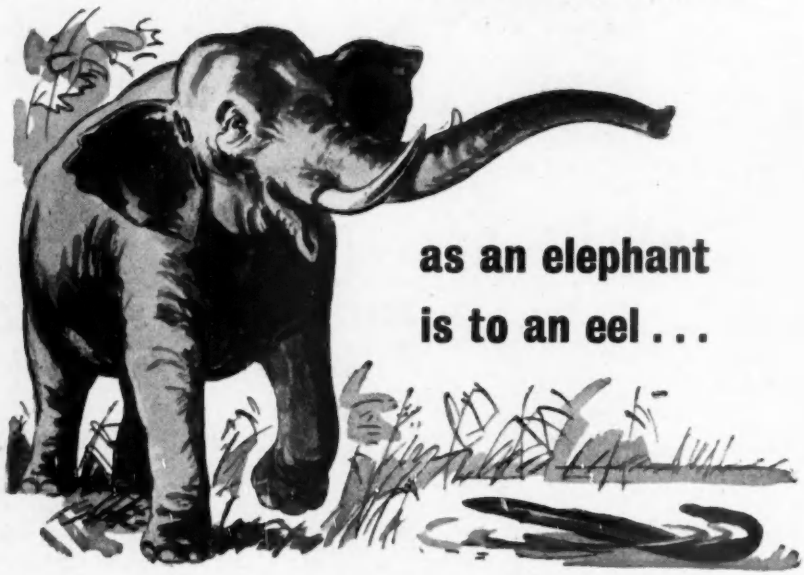

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Operating Duty: B—3'—MB.

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5 M.V.A. at 550 volts A.C. (5,250 amps.).

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5,000 amps. at 250 volts A.C.

EARTH LEAKAGE CIRCUIT BREAKER
(Double Pole)
2,500 amps. at 250 volts A.C.

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H.R.C. MINIATURE CIRCUIT BREAKERS

The reliability of our electrical equipment is already well known but we take additional pride in the Certificates of performance recently obtained at an A.S.T.A. testing station, which place Chilton Products in the forefront of specialised electrical equipment

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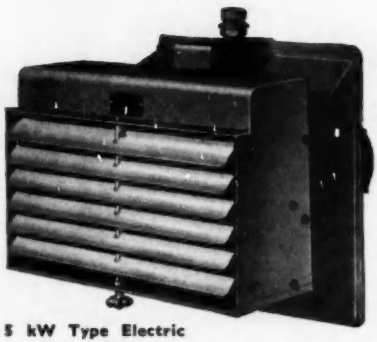
G.E.C. ELECTRIC UNIT HEATERS

You've read about them before—but *here's a summary of their many advantages* —



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★ **Modern and money-saving.**

★ **Low running costs.**

★ **Very easy to clean and maintain.**

★ **They eliminate stoking, fuel storage and ash removal.**

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For the factory, workshop, hall—or rest room ,there is no better air warmer than the G.E.C electric unit heater! But write for publication H5—and find out about this modern G.E.C way of heating.

G.E.C. *5-20 kW & 3 kW ELECTRIC UNIT HEATERS*

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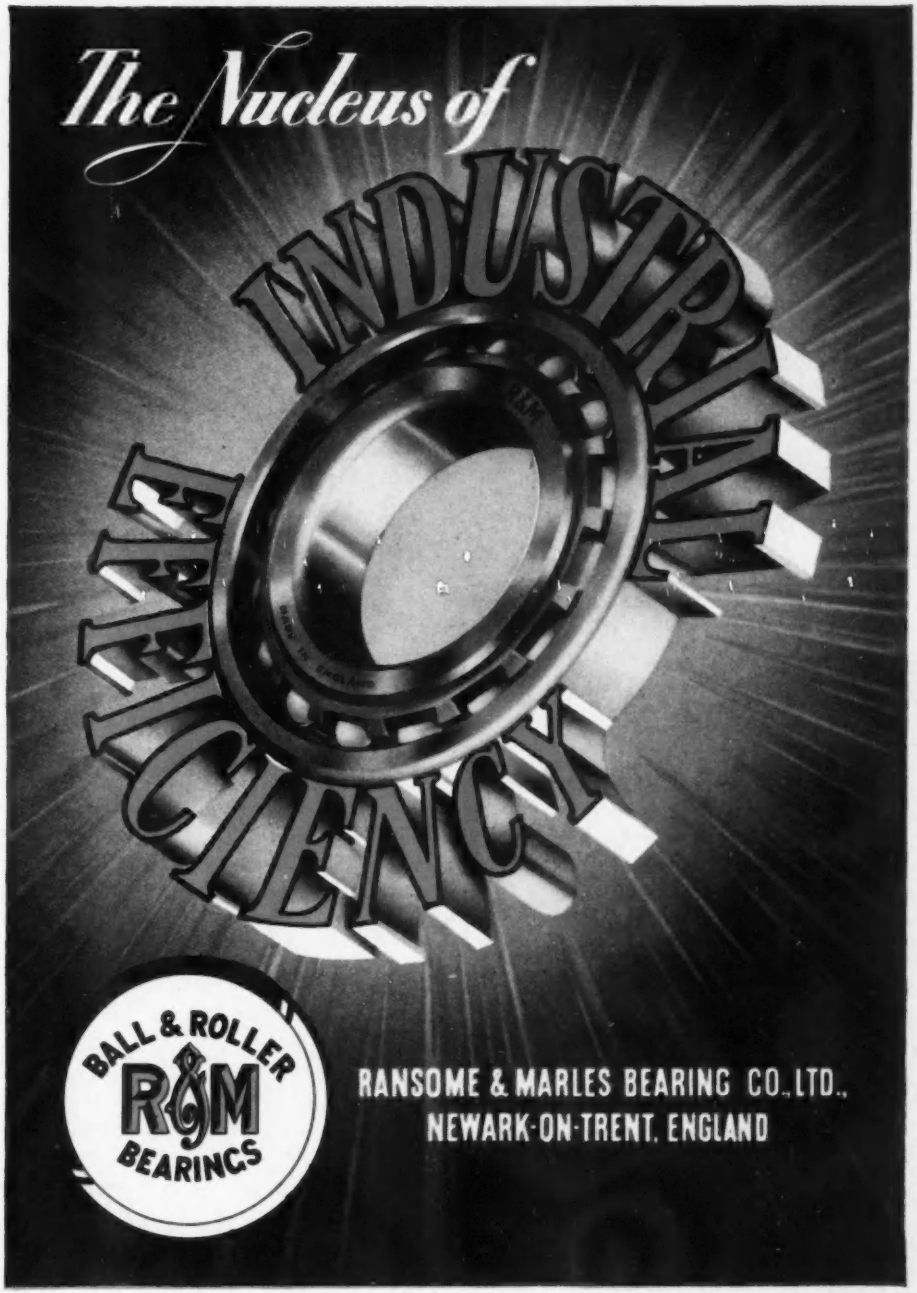
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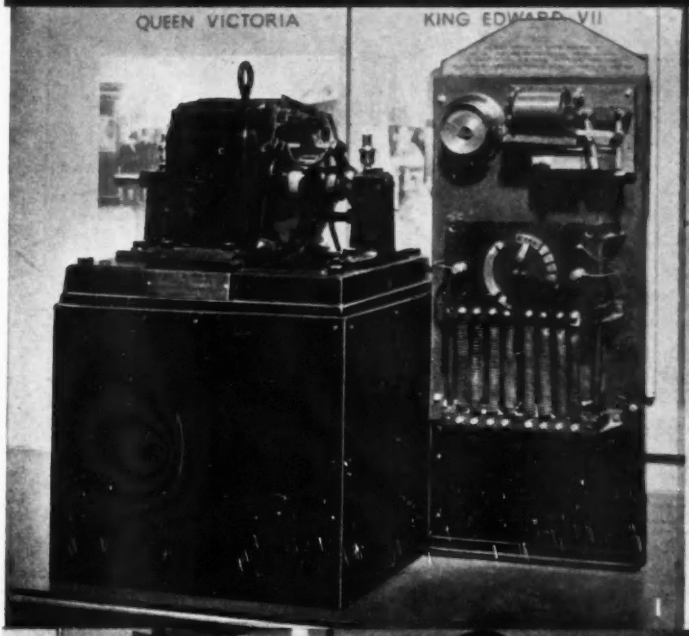

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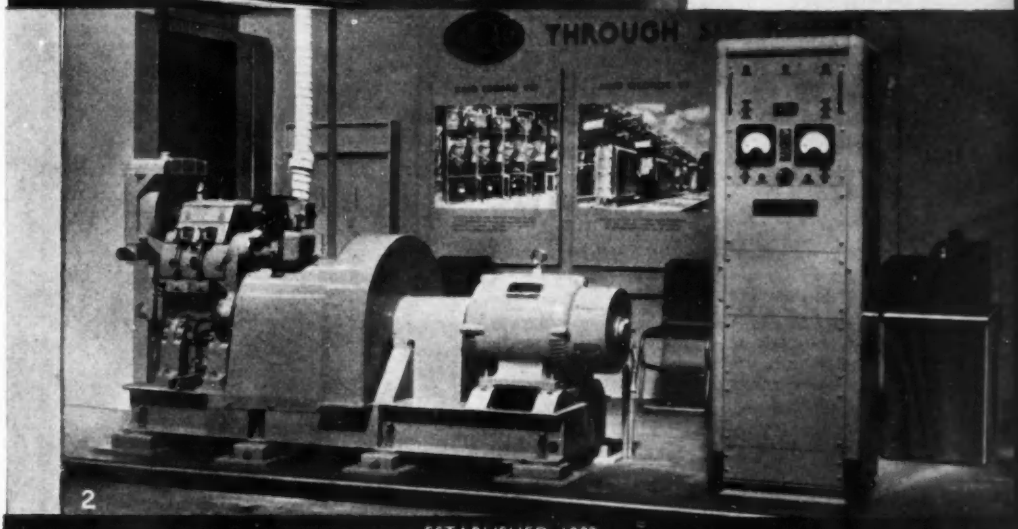

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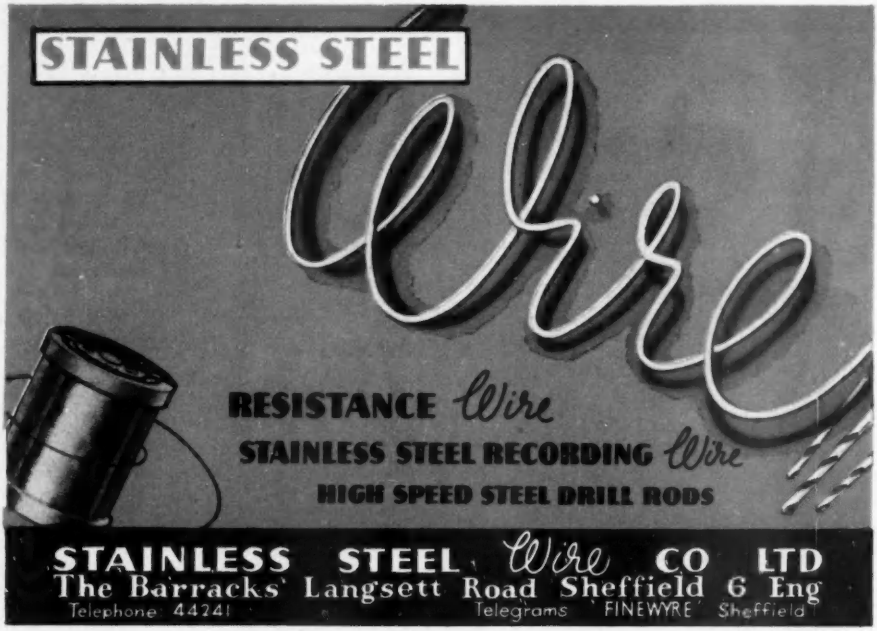

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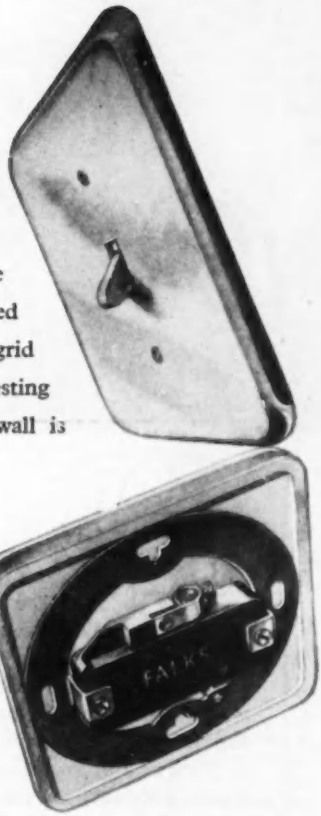

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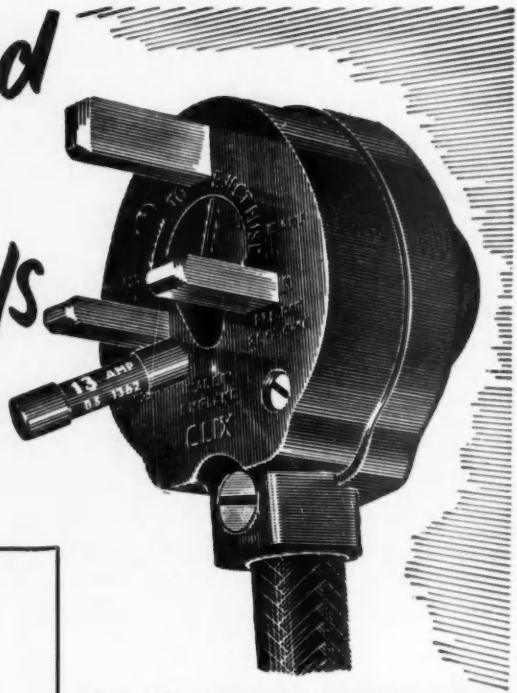

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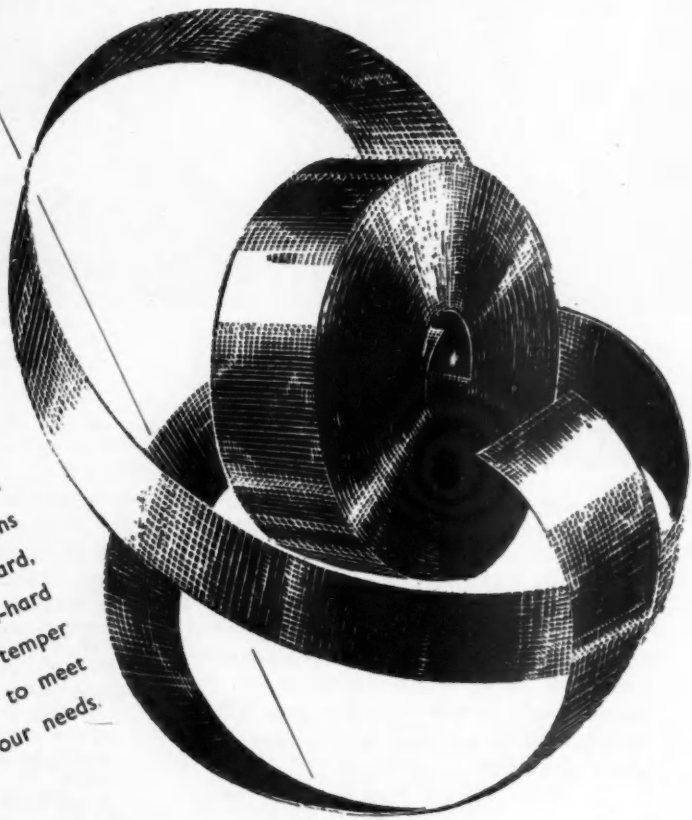

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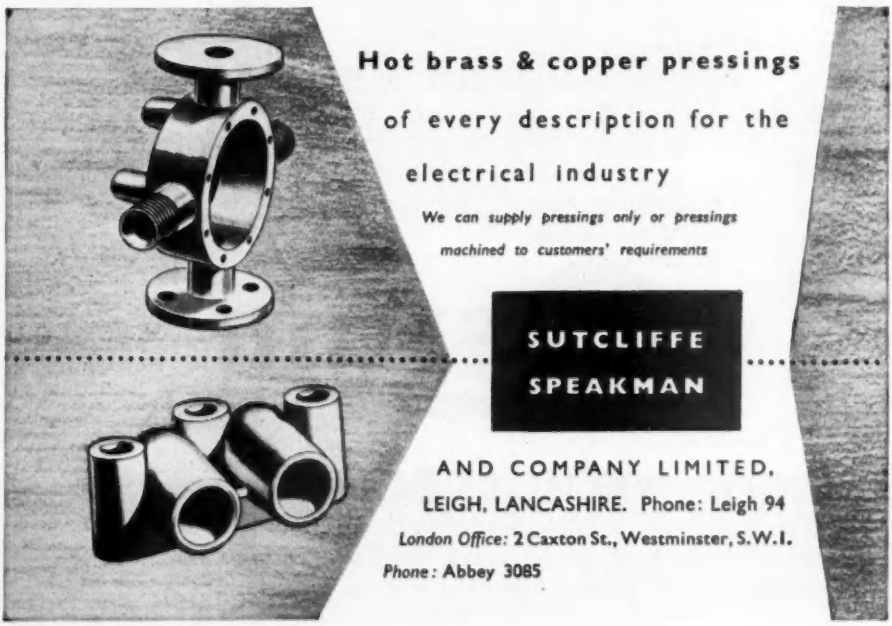

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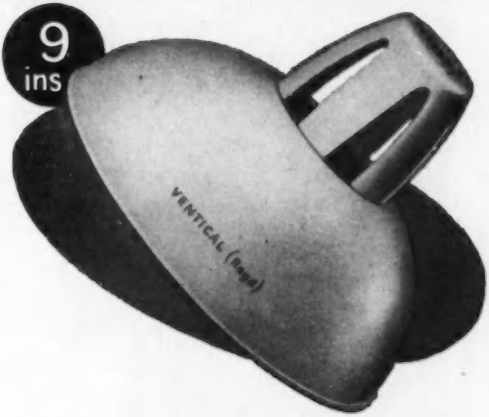

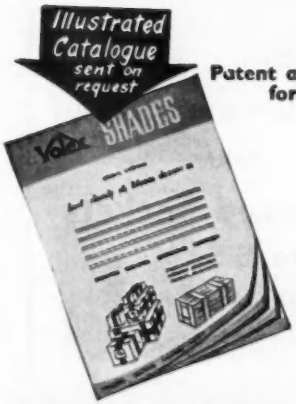

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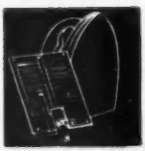

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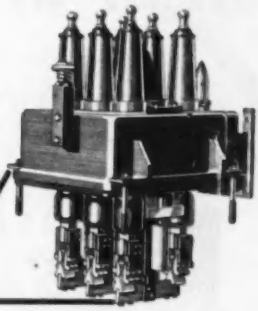

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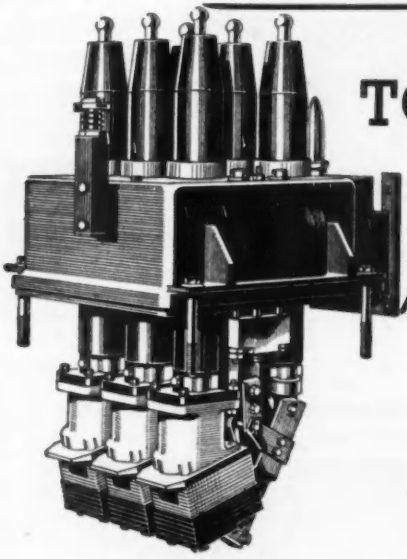

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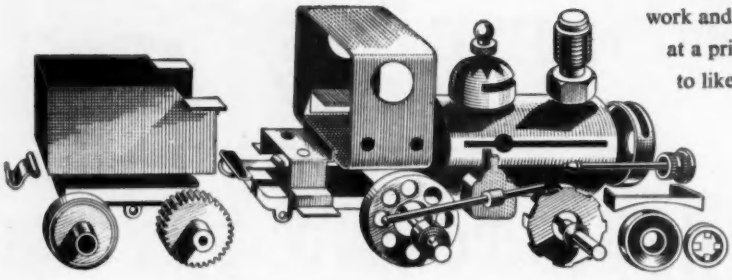

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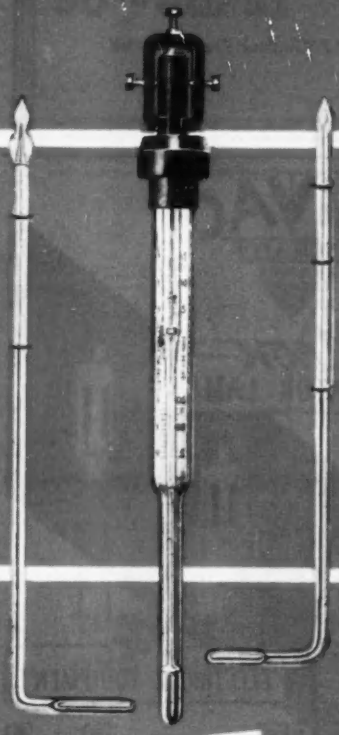

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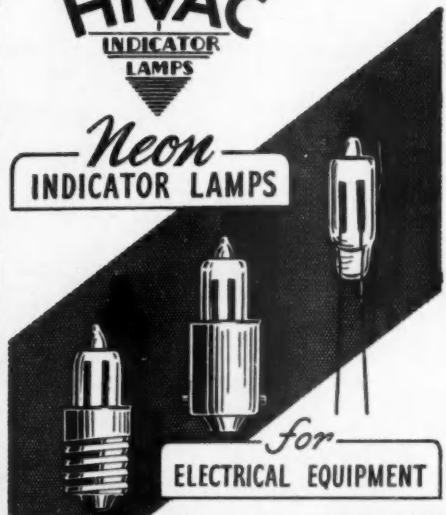

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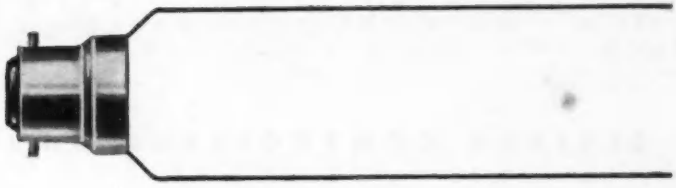

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ELECTRICAL TIMES

Volume 124 No. 3226 3 SEPTEMBER, 1953

PUBLISHED EVERY THURSDAY

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Editorial

THREE-CORE DANGER

IN the Home Office analysis of the 42 fatal electrical accidents which occurred in private homes during 1952, the commonest contributory cause of such incidents is once again lack of earthing. This is no novelty, but a study of the reports of these accidents reveals the ironical fact that quite a number of the no-earth accidents were occasioned by the attempt of manufacturers to provide every facility for safety. Three-core leads, with the earth core connected to frame are an essential link in the chain of safety when equipment is properly installed. Yet all too often, the amateur handyman who adds the plug top to the lead has a two-pin socket outlet to contend with, and finds the third core a superfluous appendage, to be left free to wander where it will. When it contacts the phase wire, the condition for an accident is fully established. Except for advice and propaganda, there is little the electrical industry can do about this danger; but one other earthing problem is more within its province. This is the matter of loop resistance. In one fatal accident the earthing installations of the house were satisfactory, but local and substation earth electrode resistances combined to exceed the maximum that would allow a fuse to blow. Loop testing is extending in use, and this unfortunate occurrence underlines its value.

POWER IN THE MILLS

THE textile industry was amongst the earliest users of steam when it began to replace water as the principal power source at the start of the industrial revolution. Large engines of up to 2,000 h.p. eventually served whole mills, driving miles of overhead shafting. Such engines have lasted well, and this fact combined with the decline in the financial state of the industry since 1910 (when steam engine building was at its peak) has meant that electrical drives have been introduced only slowly. More recently, the pace of conversion to electricity has quickened, for the engines installed at the beginning of the century are beginning to wear out, and the advantages of electric working are becoming more widely appreciated. Electrification is increasing production per operative and making mills safer and more pleasant places in which to work. The incidental problem of distributing electric power in existing textile mills raises many difficulties for the installation engineer, as one of our articles this week demonstrates. However, the mills provide a worth-while load, and there is the added incentive, to quote the I.E.E. paper read by Messrs. Cox and Swale a few years ago, of the hope that "the correct and full use of electrical energy will do much to revive and quicken an industry which can look back with pride and satisfaction on a glorious past, but which faces an incomparably more difficult future."

PRECISION IN MEANING

AS supply systems grow in size and complexity, the importance of the techniques of calculating their behaviour under a wide range of conditions becomes correspondingly more important. In recent years there have been notable advances in Britain in this field of electrical engineering, especially in the development of various types of analogue computor to speed calculations, while several less spectacular though equally important methods have also been involved. In all technological advances such as this, there comes a stage where engineers working separately on the problems concerned find that they are using the same terms to describe slightly different concepts: in power system studies this situation may be

said to exist now. The resulting uncertainty about another man's results causes a slowing-down in rate of progress. Then is the need for nationally accepted definitions, and the Electrical Research Association has served the industry well by producing at this juncture a glossary of appropriate terms which, it is hoped, will form the basis for a future British Standard. Previously there has been a need to define each term afresh or else to refer to an American Institute of Electrical Engineers test code. The availability of definitions in line with British practice will be a welcome improvement.

GAS TURBINE PROGRESS

THE Engineering and Marine Exhibition which opens at Olympia today is the nineteenth in the series. This biennial show, which is the engineering industry's own, has achieved a valuable position amongst the regular shows which present the products of the country's technological skill. It usually includes some notable introduction of special interest, and this year there is the gas turbine in its role of mechanical drive for an electrical generator. There is one particularly impressive demonstration, and there are several smaller sets and models on show. All bear witness to this growing application of the gas turbine as a stationary prime mover. This year these machines are still isolated amongst far more numerous exhibits of piston engines and of steam turbines and auxiliaries. By the time the next Engineering and Marine Exhibition comes round in 1955, they are likely to be notably more prominent, with a far greater amount of proved experience behind them.

EDUCATIONAL MINIMUM

UNDERLYING the many conflicting theories that are advanced on technical education is a widespread agreement that the provision of facilities for such training is of the greatest importance at the present time. Yet in many parts of the country, shortage of teaching space means that students are being refused and the starting of new courses delayed. The gravity of this situation is strikingly underlined in a report of the parliamentary Select Committee on Estimates. In the evidence which the Committee received there were tales of experiments having to be stopped during heavy rain because leaky roofing on temporary buildings would not protect valuable machinery, and descriptions of improvised classrooms in corridors and even under lecture theatre platforms. Such conditions are a disgrace to a nation which proclaims itself to be selling skill; worse still is the enforced refusal of would-be students because even improvisation carried to its limits will not allow the demand for teaching space to be met. To put matters right some £75 million will have to be expended on buildings and equipment. Such a capital sum is not easily come by in today's financial conditions, but technical education must rank high in any list of priorities.

HEATING FOR TV

BY tradition the focal point of the British home is the fireplace. Long familiarity with the open fire has brought about the custom of the family circle with its members suffering the extremes of temperature differences. But now a competitor has arisen. Slowly, it would seem, it is the television set that is becoming the centre of family life; it is round the screen that the chairs are placed, even though mother is darning and father filling in his coupons. The full significance of this change of focal point we leave as one more problem for sociologists, but nonetheless we must take note of the effect this is likely to have on room heating. The incongruity of a fireplace with a built-in television receiver is something we can safely leave to the future, but in the Radio Shows of the next few years we may well see electric fires built into television consoles. For the average viewer, however, the heating requirement will clearly be a more uniform temperature throughout the room, and this must be the aim of our appliances.

Meteor

3 SEPTEMBER, 1953

SWITCH-ON in Spinning

Electrical Installation of a spinning mill indicates requirements for electrification in Lancashire textile industry

PROLONGED emphasis since the war on increased cotton goods output has focused considerable attention on mill electrification for both machine powering and high-level lighting. Although the problems of engineering involved in wholesale conversion from the original power source concern themselves largely with the provision of suitable machine drives, the electrical installation makes a useful study for the electrical engineer. Generalisation of requirements for such installations is made difficult by the variety of processes involved in the production of different cotton goods. A brief description, however, of the fundamental processes provides a useful guide to these requirements.

In the Lancashire cotton industry, it is common for the three stages in the production of finished fabrics—spinning, weaving and finishing—to be undertaken separately by different companies, although sometimes the first two, and occasionally all three, are found on the same site. Each stage requires a different approach to electrification, although there are similarities in the first two, as each usually involves a large number of machines situated adjacently in rows.

The first process in the initial stage takes place in the blowing room and involves "opening up" or loosening the cotton fibres, during which a substantial part of the foreign matter is removed. The power requirements for a typical opening "range" are of the order of 30 to 40 h.p. either in a single motor or each part individually driven.

Fig. 1.—Above is a general view of the second floor spinning and carding room at Park Mill

From here, the loosened cotton fibre is conveyed to a scutching and lap machine, in which not only further cleaning takes place, but the first control of "evenness" is effected. In this process the fibres are further loosened by revolving blades, and emerge as a continuous sheet, or lap. Individual drives for each part (scutching and lapping) may be utilised, requiring approximately 7 h.p. for the whole process, although in some cases this process, and that of opening, are carried out in continuous sequence.

Carding Process

Then follows carding, which is common to all types of spinning. Carding engines, however, differ in design according to the type of spinning being done—"fine" spinning, which produces "quality" yarn, or "waste" spinning, which utilises the "waste" from fine spinning.

In the carding room, the cotton lap is fed into carding engines. These machines, the essential feature of which is a revolving cylinder of "cards" of radially mounted fine steel teeth, break up the cotton to convert it into a continuous rope or sliver of parallel fibres. Such machines may be group or individually driven, one requiring approximately 1½ h.p., but the inertia of the carding cylinder requires a motor of high starting torque. Depending on the quality of yarn to

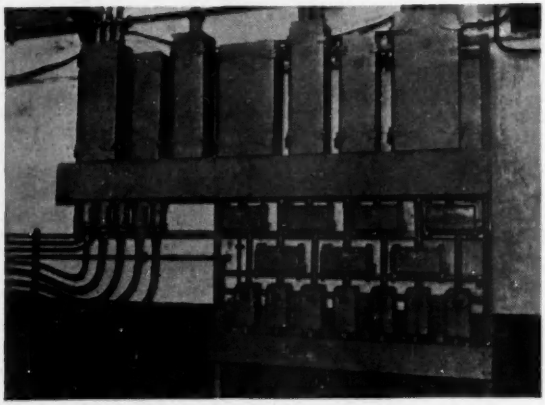


Fig. 2.—One of the distribution boards in a photo-cell controlled tungsten lighting installation at Sir John Holden's Ashfield Mill. The isolators and contactors illustrated are actuated by photo-cells mounted in a north light

be produced, the cotton may undergo several carding stages.

The sliver as it emerges from the final carding is a loose rope of parallel fibres, containing no twist and hence no strength. Before being spun, its diameter is reduced in stages, a process known as drafting, during which a degree of twist is inserted. Machines for this purpose are not dissimilar from the ring spinning frame in appearance, and require from 3 to 4 h.p., determined by the stage of drafting. As these machines are usually laid out in rows, occasioned by the original method of drive from a single overhead shaft, they lend themselves for simplicity, to group drive, but individual drive is usually to be preferred, having definite advantages over other methods.

Mule and Ring Spinning

Two methods of spinning are used; either mule spinning, the older method, or ring spinning. In both, three operations are involved—drawing out the yarn, twisting it and then winding it on to the spindle. On the mule frame drawing out and twisting are performed together, followed by winding-on; on the ring frame all three take place simultaneously. It can be seen from this comparison that ring spinning produces larger output spindle than mule spinning over a given period. On the other hand, there are probably over 50% more mule than ring spindles in use at present.

The machines differ widely in appearance and in power requirements, but in both the essential problem is that of drive rather than power. Generally high torque squirrel-cage motors, with even acceleration to reduce snatch, have proved most suitable.

For ring spinning frames, the motor size depends upon the number and type of spindles (whereas in machines used in earlier stages much of the motive power is absorbed in friction losses). For mule spinning, the general tendency has been toward group drive in the belief that the high peak loads experienced during drawing-out would be smoothed out by diversity. This is not, however, always the case in practice. As far as motor size is concerned, the required input is of the order of 1 b.h.p. to each 77 spindles, measured from an example in which 1 motor was driving 12 pairs of mules turning 27,600-odd spindles.

In both types of spinning the frames are usually arranged in lines according to the requirements of various types of building. Drive was originally from shafting running the entire length of the building and there again the simplest conversion is to substitute

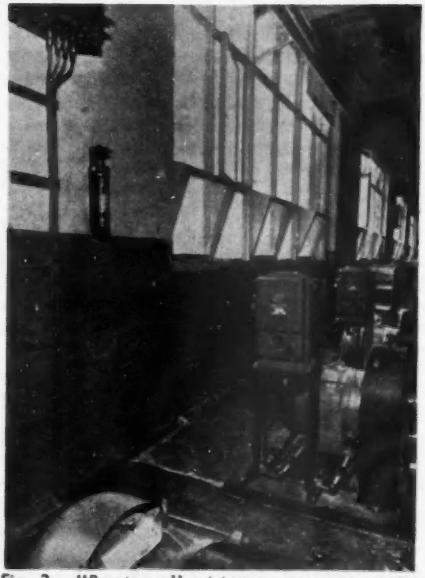


Fig. 3.—"Pyrotenax" wiring to motors powering ring spinning frames at Ashfield Mill

Fig. 5.—Fluorescent lighting in a fine spinning mill at Bolton. Use was made of the original wiring when installing the new fittings

an electric motor for the rope race drive from the single steam engine, the power source for the entire mill. As, however, the tendency is toward individual drive, the shafting can be scrapped, running conduit in its place along the ceiling, dropping down to each motor.

As spinning frames are fixed installations, busbar trunking also offers possibilities, as does

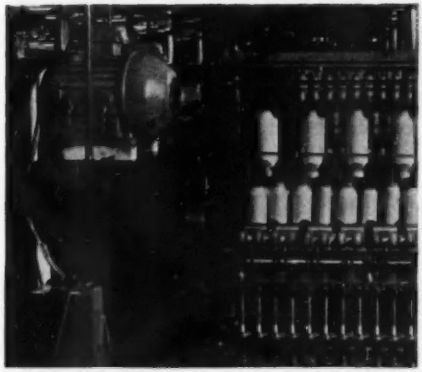


Fig. 4.—Metrovick dual motor speed control on a ring frame in a Bolton fine spinning mill

mineral - insulated copper - sheathed wiring. This method is being used at one mill visited recently, using "Pyrotenax" cables to supply 10-h.p. motors. In all 56 ring frames are involved, each 7 being supplied from a distribution box mounted on one side. From the box each cable is run down to the floor, travels along the bottom of the wall to a point opposite the motor, and is then chased into the concrete floor. Conversion itself has been made by removing the belt pulley and gearing at the driving end of the frame, and fitting to it a cast-iron bed plate, specially designed for this particular case for holding the motor and starter support. Drive to the tin roller (the roller running the whole length of the frame from which cord or band drives are taken to each spindle) is by a quadruple Vee-belt; and direct-on-line starting is used.

After spinning, the yarn, as wound on the spindle, has sometimes to be wound into other forms for use as either warp or weft before being woven, this taking place as part of the preparation process of weaving. In weaving itself, considerable attention at present is being given to conversion to automatic looms, such conversion usually accompanied by individual drives, using foot-mounted, high torque loom motors from ½ to 1½ h.p. On the other hand, it is not uncommon to find driving on the sectional group-drive principle. In this case, looms in a row across the width of the shed are driven through a transverse shaft from one wall-mounted motor, these motors having replaced the main shaft which drove, by bevel gearing, each transverse shaft.

Advantages of Electric Drive

It would not be out of place to comment generally on the advantages of electric drive in cotton mills. Individual drives give a constant speed—not always obtained on the group drive by belting from the single-power source of a steam engine. By virtue of this constant speed, production increases of approximately 3% in spinning and up to 10% in weaving may be obtained, ignoring any increase in quality or output. Easy metering ensures a close check on production costs.

Moreover, losses involved in supplying power are considerably reduced. Up to 40% of the total input power can be lost in transmission by belting and shafting. Flexibility in mill operation is a further feature, electric drive permitting the running of any portion of the mill at will, whilst the remainder may be shut down completely. Not only is this flexibility confined to operation, as extensions may be made to the installation unrestricted by transmission considerations. Apart from

these considerations, there is in addition the saving in both space and manpower taken up by the operation of steam power plant.

It should be borne in mind that the foregoing description is on only a general basis and, as previously mentioned, in but a few instances can a general plan for an installation be formulated, as in the case of individually driven ring frames where neither layout nor power requirements vary widely. The instructive value, however, of a description of a particular installation is not to be denied and the recently completed installation in the spinning section at the Park Mill of J. H. Birtwistle and Co. (Mfrs.) Ltd. provides a useful example of mill electrification. Most of this mill's spinning output is a heavy yarn of low count, known as condenser yarn, produced from cotton waste. For this reason opening and breaking machines differ somewhat in detail from those dealing with raw cotton. Although both spinning and weaving takes place at the mill, the installation affects at present only spinning, but makes allowance for future modernisation of weaving plant.

General Layout

The mill buildings are disposed round a central yard, access to which is through an enclosed carriage-way from the front. On the left-hand side rises the three-storey building housing carding and spinning machinery on each floor. At the far end of the yard is situated the larger of the two weaving sheds, the smaller being to the right. Offices take up part of the building facing the road to the right-hand side of the yard entrance.

Immediately behind these offices is located the switch room originally housing the steam engine power source for the entire mill. Main switchgear, arranged on two adjacent frames at right angles, comprises one 8-circuit Reyrolle switchboard of the metal-clad, totally enclosed type. On the 800 A oil circuit-breaker panel is mounted a horizontal draw-out, oil-immersed, direct-operated, circuit-breaker fitted with 1,000 A busbars. Over-current time-limit protection on the three phases and core balance earth fault protection are provided. Also mounted on the bus-section panel are the four, 800/5, class 15 VA c.t.s., together with three 5 A c.t. operated trip coils with time-lag dash pots and one 30 V d.c. trip coil. A 6-in. dial ammeter, reading 1,000 amps full scale, provides indication of load current.

From the 800 A busbars housed in a cast-iron chamber are fed seven outgoing circuits. Of these circuits three supply sub-mains switchboards, and the remainder the load existing in the small weaving shed, offices and buildings on the right of the mill yard.

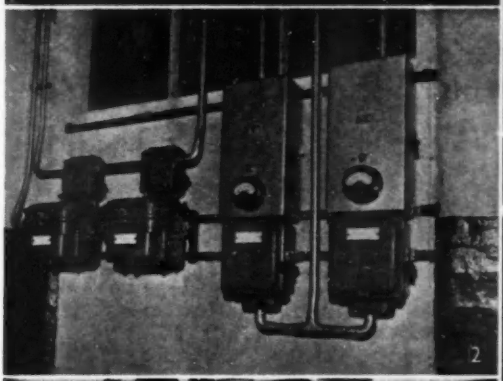
Warehouse Requirements

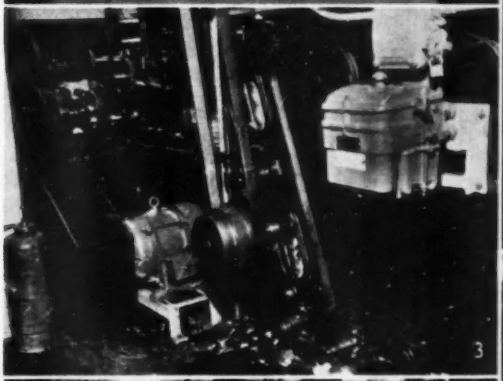
Of the latter, requirements of the cloth warehouse are met by a 60 A t.p.n. switch-fuse for power and a 60 A s.p.n. switchfuse, fused at 30 A, for lighting, both supplies being fed in v.r.i. cable run in conduit. The lighting is supplied from a six-way distribution board in the warehouse. Only this at present is in use, as the 60 A t.p.n. distribution board for power has been installed to meet anticipated requirements for small machinery. The second 60 A t.p.n. switch fuse on the main board supplies the existing power distribution board in the small weaving shed. Tungsten filament lighting here, and in remaining rooms, corridors and offices on the right of the mill yard is supplied from a 60 A s.p.n. switchfuse on the main board through a 10-way s.p.n. distribution board in the smaller weaving shed.

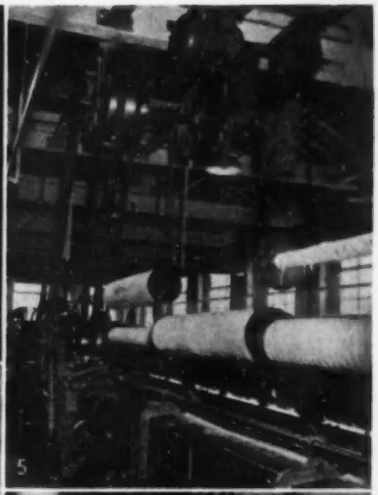
Supply to Rest of Mill

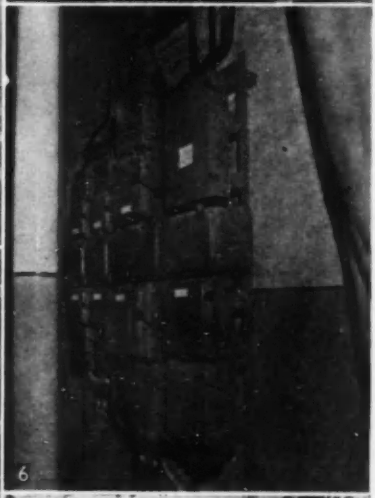
The remainder of the mill is supplied from three sub-main boards each fed from the main switchboard. On the ground floor, the sub-mains board distributes power and lighting supplies to all buildings on the left of the mill yard, which include the spinning room on this floor, larger weaving shed and scutching room. It is located in this weaving shed, mounted against the wall adjoining the spinning room. Supply to it is taken through a four-core p.i.l.c.s.t.a.s. cable, of 0·25 sq in. cross section, run along the spinning room wall and under the roof of the enclosed section linking this room to the large weaving shed. At its supply end the cable originates at a 400 A switchfuse, fused at 350 A, on the main board. At the switchboard it terminates

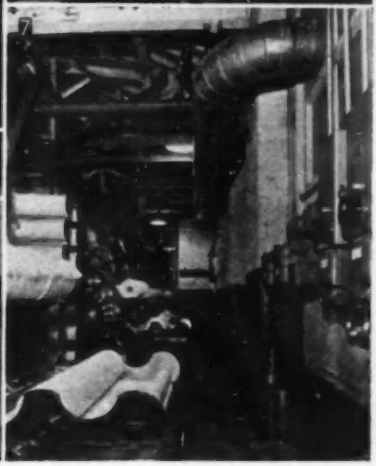
Fig. 6.—Park Mill installation in pictures (1) the 35 h.p. motor powering the breaking and opening range, (2) on the right are starters and isolators for two 14 h.p. mule frame motors whilst left is seen switch and starting gear for two 12½ h.p. carding engine motors, (3) mounting and location of the 5 h.p. scutcher motor and its switchgear, (4) main switchboard, with incoming supplies on left and switchgear for outgoing section on right; (5) a 14 h.p. mule frame motor, showing method of drive to mule head, (6) sub-main switchboard in the blowing room, supplying all first floor requirements, and (7) carding engines, seven or eight being driven from one 12½ h.p. motor mounted above on roof beams











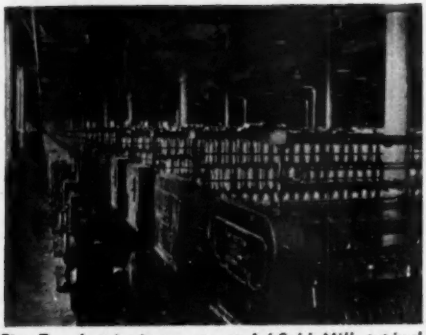


Fig. 7.—A spinning room at Ashfield Mill, typical of many. The tungsten lighting installation is photocell controlled, lines of lamps being switched on in sequence as the level of daylight lighting falls

in a 400 A t.p.n. isolator mounted on the upper side of the 500 A busbars.

From a 100 A t.p. switchfuse fused at 80 A on the board are supplied the four motors on the ground-floor spinning room. These supplies are fed by three 19/064 v.r.i. cables in 1½ in. conduit through the wall to the 60 A, 6-way t.p. distribution board. One of these ways supplies one 12½-h.p. motor, which drives a group of seven or eight carding engines. From another two are taken supplies for two 14-h.p. motors each powering a mule spinning frame. Another way serves a 5-h.p. motor powering a fan for dust extraction from each card.

A motor starter panel, mounted opposite the frames controls both spinning frame motors, each provided with an isolator, oil-immersed switch and starter unit. The latter incorporates an ammeter, providing a rapid indication of faulty operation. For operation, each motor is actuated by a remote-control unit on the mule head, consisting of stop, start and inching push-buttons. For safety, the unit incorporates a key switch. Separate wall-mounted starters control the carding engine motors.

Such is the construction of this mill that all motors can be mounted on frames fixed between ceiling joists, which has minimised alteration in drives to the machines themselves. Moreover, the joists have provided convenient means by which to carry conduit for each motor, and for lighting supplies. Due to the dust and cotton fibre content in the atmosphere, totally enclosed fan-cooled motors are used, a common practice in the industry generally.

Also on this floor is found the scutching room, adjacent to the spinning room. Supply to its five motors is from a 15 A t.p. switch-fuse on the sub-main board, using three 7/052 v.r.i. cables run in 1-in. conduit to a 5-way 20 A distribution board. From here conduit runs are made across the ceiling, dropping to each starter unit. Both motors and starters are mounted on the machine, that driving the hopper rated at 2 h.p. and that driving the beater 5 h.p., both on one scutching machine. Two complete scutching machines are installed, the fifth motor in use

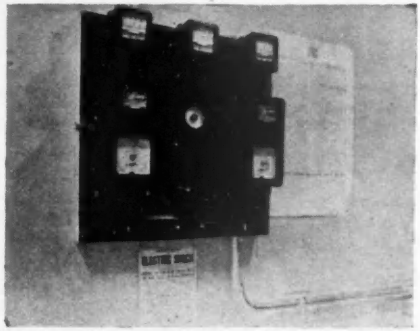


Fig. 8.—The meter board at Park Mill, showing energy and maximum demand meters

driving a fan to extract dust and cotton fibre liberated during scutching.

Tungsten filament lighting, using in the main, Benjamin "Saaflux" reflectors is employed throughout the mill. For the scutching room's four units, together with three others, supply is taken from a 15 A s.p.n. switch fuse on the sub-main board to a 6 way distribution board. Seven fittings using 200 W lamps provide illumination for the spinning room. This supply is taken from a 40 A s.p.n. switchfuse through an 8 way board in this room. Also supplied from the sub-main board is the existing weaving shed lighting and group drive to the looms, for which provision has been made for conversion to individual drive in the future.

On the first floor, the sub-main board is installed in the blowing room. As in the previous case, incoming supply is from a 400 A switchfuse (fused at 350 A) on the main board, through a four core, 0·25 sq. in. p.i.l.c.s.t.a.s. cable run up the original rope race to a 400 A t.p.n isolator. Power to the spinning room on this floor is taken from a 200 A t.p. switchfuse, fused at 150 A, in three core 0·06 sq in. p.i.l.c.s.t.a.s. cable to an 8-way board. From this are fed two 12½ h.p. motors, each driving a group of eight carding

engines, and four 14 h.p. motors each driving a mule frame, as on the ground floor. The heavier switchgear on this board is required, however, to cater for power for two Derby doubling machines. Here supplies for the 5 h.p. motor on each one are run from the dis-board in conduit under the floor.

Lighting in the spinning room is supplied from a 60 A s.p.n. switch fuse on the sub-main board. The 7/064 v.r.i. cable is run, together with the cable for power requirements, in trunking to the spinning room, where it is distributed to the ten lighting fittings from a 14 way s.p.n. board.

In the blowing room itself, three motors are supplied direct from the sub-main board through a 6 way 60 A distribution board. Fed from this board is the 35 h.p. motor powering the cotton opening and cleaning range, which consists of bale openers, porcupines, Crighton openers, dust trunks and a sheet-forming exhaust opener. Its starter gear is floor mounted, adjacent to the main board. Conduit is run up to the ceiling joists from which the motor is mounted.

Supplies to the remaining two motors, floor mounted, 20 h.p. machines driving hard waste breakers are taken in conduit run along the wall. A 60 A s.p.n. switchfuse provides the main control for lighting in this room, and a similar unit controls the remaining lighting in the tape room, and store on this floor. Provision for future power in these rooms is made by a 60 A t.p. switchfuse on the main board.

Second Floor Installation

All electrical supplies for the second floor core are taken in four core, 0·1 sq. in. p.i.l.c.s.w.a. cable from a 200 A t.p.n. switchfuse on the main board. Of the "non-bleed" type, the cable extends up the rope race, to the first floor. From here it is taken up the wall and through the floor to the 200 A isolator on the second floor sub-main board vertically above that on the floor below. From it are supplied, through a 60 A t.p.n. switchfuse, fused at 30 A, an 8 way board for hoist motors, and dust extractor motor. As in the case of the ground floor installation, dust exhaustion is carried out from each individual card throughout the mill.

Supplies to the spinning room are identical with those of the first floor, a four core 0·06 sq. in. p.i.l.c.s.t.a.s. cable fed from a 200 A t.p. switchfuse running to a 10 way 60 A t.p. power distribution board. The twelve lighting fittings in this room are supplied from a 60 A s.p.n. switchfuse through a 12 way board. Remaining lighting, totalling 10 units is supplied from a 60 A s.p.n. switchfuse, fused at 30 A, through a six way board.

Finally mention should be made of metering in the switch room. Apart from the ammeter in the main o.c.b. switchgear all meters are mounted on a board fixed to the wall. They comprise three single phase kWh meters, maximum kW demand and maximum kVA demand meters.

Acknowledgments are made to the North Western Electricity Board, contractors for the Park Mill installation, and J. H. Birtwistle and Co. (Mfrs.) Ltd. for permission to publish this article, and for their assistance.

DUST SAMPLING

A DUST sampling, equipment, approved by the British Electricity Authority is described in Memorandum/GO/0326/ET. This apparatus is based on a recommendation made by sub-committee No. 2 (The Dust Measurement) of the Generating Station Operation-Research Liaison Committee, is of the "two-stage" type and comprises a cyclone collector followed by a glass wool or slag wool filter.

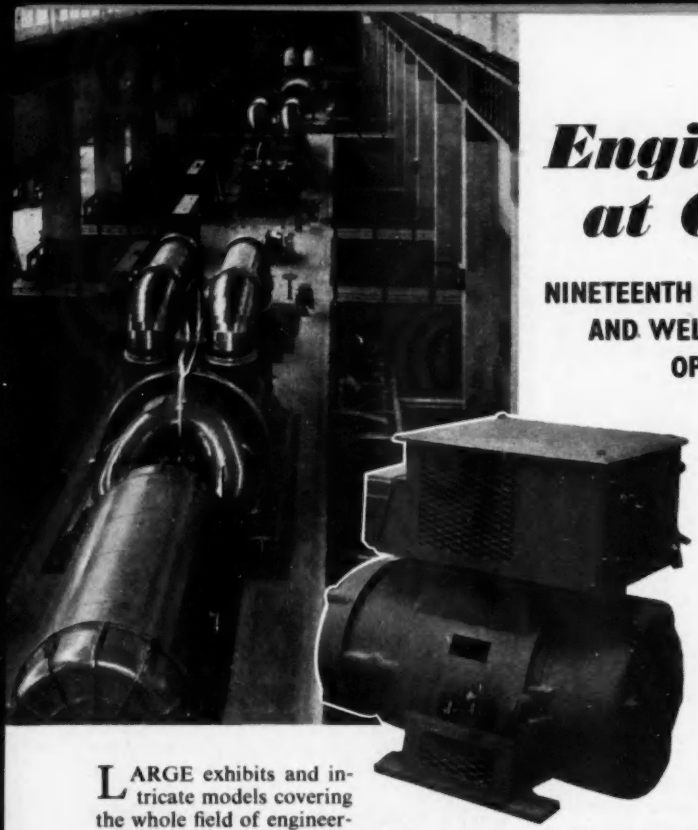
As the equipment and the recommended test procedure are intended for official tests and for investigations where accuracy and reproducibility are of prime importance, a dry process of collection has been adopted and to comply with this requirement the dust sampling probe and the separator unit are electrically heated to prevent condensation.

The bulletin contains a full description of the apparatus and includes suggestions for the arrangement of supports as lightweight scaffolding is provided with each set of equipment. Recommendations are given as to the method of improvising supports and scaffolding for chimney testing and it is suggested that in the case of new chimneys, facilities should be considered and provided during construction.

Most comprehensive details are given of the test method to be adopted and of the procedure required in estimating the dust and of the necessary chemical analyses of the samples. A series of appendices gives further important data, including location of sampling holes and test points, definitions and calculation of results, apparatus designs and ratings list of equipment required, and a calculation sheet.

Engineering at Olympia

NINETEENTH ENGINEERING, MARINE AND WELDING EXHIBITION OPENS TODAY



LARGE exhibits and intricate models covering the whole field of engineering are features expected at the biennial Engineering and Marine Exhibitions. The show, which opens at Olympia today is no exception. It is the nineteenth exhibition, and its full title has expanded in its near-fifty years of existence to the "Engineering, Marine and Welding Exhibition and the Chemical Plant Exhibition."

There is particular interest for the electrical industry in this 1953 exhibition, because quite apart from the strong electrical representation amongst the 500 or so stands, the Honorary President is an electrical man. He is Mr. D. D. Walker, M.A., M.I.E.E., Joint Managing Director of Evershed and Vignoles Ltd. and the present Chairman of B.E.A.M.A. The show over which he presides will be open from today (3 September) until Thursday, 17 September, from 10 a.m. to 8 p.m. each day excluding Sunday. On Monday, 14th September, there is to be the usual official visit of the Institution of Electrical Engineers to the exhibition, and other professional institutions and similar organisations are paying similar visits.

Richardsons, Westgarth, Ltd., built the turbines for Brighton "B" station seen above. A smaller rotary machine is this welding generator, by Reyrolles

Gas Turbines

It is fairly easy for once to select the outstanding exhibit of the year. This is provided by Ruston and Hornsby Ltd., who with the co-operation of the exhibition officials and of the London Electricity Board, have arranged to operate a gas-turbine driven alternator to supply the exhibition's power requirements. The turbine will supply power to the Olympia substation at 6·6 kV, and there it will be transformed down to 400/230 V to serve the lighting circuits of the Grand, National and Empire Halls, and certain power requirements of exhibits. The alternator is by B.T.H.

The turbine selected for the demonstration is the latest of the company's design, Mark TA. It is a lightweight unit for industrial use, now in batch production, and suitable for a range of fuels including diesel oil, natural gas and coal tar fuel. The machine at Olympia, which can be inspected by visitors to the exhibition, is of the non-recuperative type. Its rating is 900 kW, but it can be operated with a heat interchanger at a markedly higher rating.

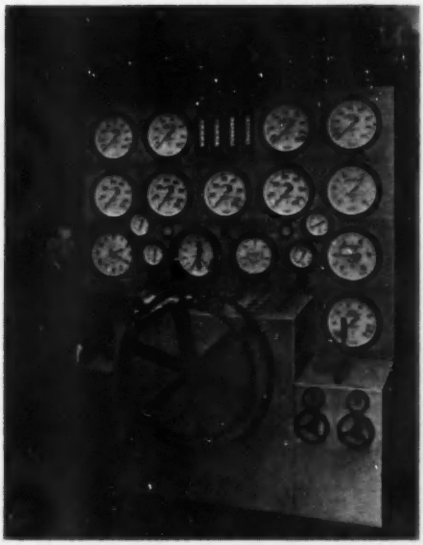
Large Exhibits

Although the gas turbine, with its accessories, is the largest exhibit there are several others that are impressive for sheer size. Many of these are in the diesel field, but there are several of electrical power interest.

Notable amongst these is a completely bladed high pressure turbine shaft for a 60 MW 3,000 r.p.m. three cylinder turbo-alternator. This is exhibited by C. A. Parsons and Co. The blading on the shaft is arranged for a constant mean diameter, necessitating only a single dummy to balance the steam thrust on the blades. A part-finished forged alternator shaft 35 ft long and 3 ft 6 in. dia. is shown by Thomas Firth and John Brown Ltd.

Another item which many engineers will wish to inspect is a large eight-cylinder four-cycle turbo-supercharged diesel engine, coupled to a Harland and Wolff alternator and exciter. This 1,280 kW, 333 r.p.m. set is one of several ordered by the B.E.A. for their Blackpool power station. The English Electric Co. also has an exhibit out of the usual run, with one of five dual-fuel i.c. engines being manufactured for power generation at the National Coal Board's Point of Ayr Colliery. This colliery, situated on the Flintshire side of the mouth of the River Dee, has the unusual feature of an apparently inexhaustible supply of rich methane gas which is emitted from the coal seams. The engines being installed can run on this methane, with a pilot injection of oil fuel to ignite the gas. Engines have 15 in. bore and 20 in. stroke.

Three other large exhibits come into the control class. First may be mentioned the control cubicle for a 7,000 s.h.p. single-screw diesel-electric machine propulsion unit, shown by the B.T.H. Co. This equipment comprises four diesel driven d.c. generators and a double unit propeller motor, together with auxiliary equipment and control gear. The main propulsion system operates on the controlled constant-current principle, with amplidyne exciters on all machines. An engine room control desk for a 600 s.h.p. diesel-electric trawler is shown by Metropolitan-Vickers Electrical Co. This will be installed in a Fisheries Research trawler, the first of its type to be built in this country and the first to operate with metadyne control. Finally in this trio there is the steam turbine control desk for an 8,000 s.h.p. cargo vessel, which is to have 600 lb/sq in., 950° F steam conditions, the highest yet used for British merchant ships. This is another Metropolitan-Vickers exhibit.



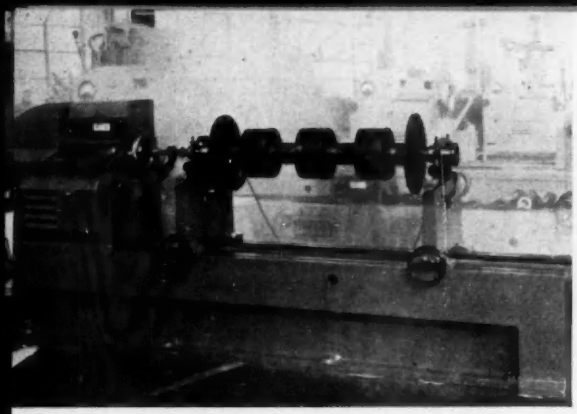
This control panel is for a Metropolitan-Vickers 8,000-s.h.p. geared steam turbine in ss. "Nestor"

Scientific Advances

Engineering applications of some of the more recent scientific advances are well to the fore on some stands. Radio-isotopes provide an example, and their use in development work is demonstrated by Shell-Mex and B.P. Ltd. The unit used is a single-cylinder compression-ignition engine fitted with a piston ring that has been irradiated in the atomic pile at Harwell. Engine wear is electronically calculated and recorded while the engine is running. Containers for radioactive isotopes to be used for radiographic examination of metals are shown by Newton Victor Ltd.

Television in its growing applications figures prominently too. Babcock and Wilcox Ltd. are concerned here, with a demonstration of Bailey Meters and Control's "Levelscope," an application of closed-circuit television for remote water gauge indication. The camera unit of this system carries its own built-in ultra-violet lamp so that it can obtain its picture of the water-gauge in total darkness if necessary. Under water television is on view at the stand of Siebe Gorman and Co. Ltd.

Electronic high speed recording equipment in which frequencies from zero to 2,000 c/s are directly recorded on 35 mm. Teledeltos paper is shown by Dobbie McInnes. This is a development of the Ferranti design of high speed direct recorder which we described some time ago. It has the advantage that permanent records (accurate to 1½%) are available to an operator immediately after an experiment.



On the left is a recent introduction into the Avery range of electrodynamic balancing machines for rotors and shafts

The most advanced scientific demonstrations are, not unnaturally, to be found on the D.S.I.R. stand. An example is the transparent working model of a double-acting reciprocating feeder being developed for the hydraulic transport of solids such as coal. This is being developed by the British Hydromechanics Research Association as a means of introducing the coal into a high pressure pipe line. From the Torry Research Station comes a compact refrigeration unit designed for installation in commercial distant-water trawlers. It is designed for simplicity in operation so that special skilled labour is not required for its use. Finally may be noted an exhibit of Pametrada on vibration analysis in rotating machinery.

Pumps and Models

As usual there is a wide range of pumps on view, of which one may be picked out as being of special interest. This is a Mono Pumps unit, developed for handling dry materials. It is shown drawing powder from a hopper, and then lifting the material back to the hopper.

In concluding this overall survey of some of the exhibition's outstanding attractions, mention must be made of the models, which in their combined intricacy and miniature accuracy are always doubly welcome. Boiler makers are well to the fore, of course, an example being International Combustion Ltd., with a model of the boiler installation at Drakelow, and another featuring p.f. corner burners. Babcock and Wilcox are showing the large 830 klb/hr Castle Donington boiler, and also an example of a plant designed for the difficult task of handling washery slurries.

Power station equipment in model form is shown by John Brown and Co., representing a 1 MW coal-fired gas turbo-alternator, Richardsons, Westgarth, with Brighton B sets, and Metropolitan-Vickers Electrical with a ½ in. to 1 ft representation of a 40 MVA synchronous condensor which, although it has a 61 ton rotor, can be erected using only a 3 ton mobile crane.

All these exhibits, however, are only a small part of the total display. In the following pages other stands of electrical engineering interest are reviewed separately, and then some other sections of the exhibition are noted.

W. H. Allen

Largest electrical machine on this stand is a 500 kW alternator, which is coupled to a two-stroke diesel engine. This alternator is of the rotating salient pole type, running at 333 r.p.m. It is designed with parallel operation in mind, and damper windings are fitted in the rotor pole faces to assist this. An automatic carbon pile type voltage regulator is included.

Allen West and Co.

Amongst the exhibits selected from this firm's extensive range are lifting magnets for use in materials handling.

W. T. Avery

Rotors weighing between 6 and 600 lb can be balanced on the 7210 dynamic balancer being exhibited here. A smaller model is shown for weights between 3 oz and 20 lb. The machine is of the direct electric indicating type in which vibrations of the bearings due to rotor unbalance produce a current in moving coil pick-ups. This current is compared in a calibrated wattmeter with that produced by a phase generator driven from the main spindle. The meter indicates unbalance in terms of vertical and horizontal components.

Babcock and Wilcox

Models of boilers, always a feature of this stand, are backed-up by a demonstration of the "Levelscope," which is believed to be the first application of closed-circuit television for remote water gauge indication to become commercially available in Britain. It consists of a simple camera unit with power pack incorporated, and a receiver unit mounted in a convenient control position. The camera carries a built-in ultra-violet lamp, and the units are connected by a co-axial cable.

Barlow-Whitney

Of particular interest on this stand is a single autoclave unit complete with all equipment for vacuum impregnation, suitable for use with M. of S. approved solventless and solvent type varnishes. There is also a self-contained humidity test cabinet (20°—110° C; 40% to 100% r.h.) for testing electrical equipment.

B.I.C.C.

Specialised cables for ship wiring, welding service and for general industrial installations, together with accessories, are featured here.

Blackburn & General Aircraft

Small industrial turbines in the company's gas turbine range are shown here, including a 400 h.p. model designed to power stand-by generating plant.

British Equipment Co.

Generating sets rated at 1 and 3 kW are on view here. These sets are particularly suitable for duty on board ships during repair work and are powered by a Bernard four-stroke petrol engine. Generators for 230 and 110 V d.c. are available.

British Ropes

Nylon takes the leading place on this stand, both for ropes and industrial cloths, but electrical engineers may be more interested in the new braided wire rope slings exhibited. These slings comprise eight steel wire ropes braided together, and are notable for their flexibility and strength.

Brush Electrical Engineering

A five panel 6·6 kV, 150 MVA vertical draw-out switchboard is shown here, together with a four-circuit 440 V fuse switchboard of 300 amp capacity, incorporating h.r.c. fuses of Brush manufacture. Alternators manufactured by the firm are shown in connection with the Brush Group Engineering exhibits.

B.T.H.

Apart from the ship-control cabinet already mentioned, there is particular interest on this stand in the new "Stavolt" close voltage-regulation alternator, and in a range of totally enclosed fan-cooled motors conforming to draft British Standard dimensions. Another exhibit is a 45 MVA, 660V truck type switchgear unit for power station and industrial applications.

Brookhirst Switchgear

Notable amongst the new products exhibited here is a range of a.c. straight-on starters. These are of the contactor type, enclosed in dust-protecting wall-fixing metal cases, and are available for voltages from 200 to 550. The range is manufactured for stock and is available "off the shelf."

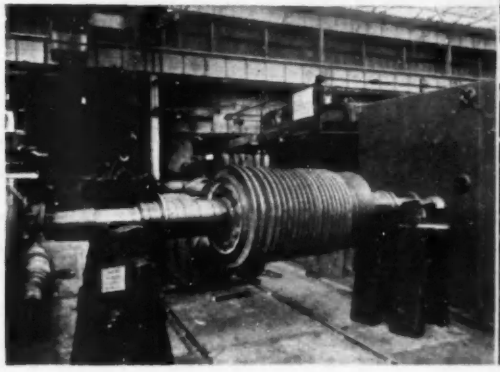
John Brown & Co.

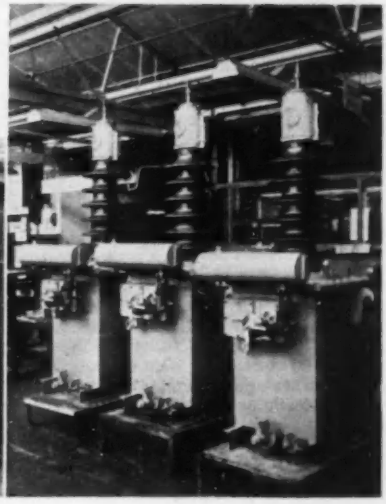
Models on this stand include one of a 1 MW coal-fired gas-turbo-alternator, with provision for waste heat utilisation.

C.A.V.

Electric starters shown include a 7 in. dia. heavy duty type with two-stage action. A pinion first moves into engagement with the engine flywheel on a helical thread at low speed and

On the right is a bank of 38·1 kV potential transformers being shown by Foster Transformers on the LDC stand. Below is seen the h.p. shaft for a C. A. Parsons 3-cylinder 60 MW turbine





reduced voltage; then a trip-switch operates and full voltage is applied to the starter, giving full torque once the pinion has engaged the flywheel gear ring.

Consolidated Pneumatic

Demonstrated on this stand are Hicycle high frequency electric tools ranging from small ¼ in. drills to heavy engineering models of 2 in. capacity and over.

Crompton Parkinson

A selection of new designs of C.P. electrical measuring instruments is presented on this stand, including 4 in. and 6 in. dial short scale types in pressed steel cases. Also on view are squirrel-cage induction motors to the draft B.S. The theme of the stand is the development of equipment with standardised dimensions.

D.P. Battery Co.

Traction batteries have a prominent position in this display, notable items being the special high performance Kathanode range for diesel engine starting on main line and passenger locomotives, and Kathanode marine type batteries.

D.S.I.R.

Some of the Department's exhibits have already been mentioned. Amongst other items of note is a purity sampling unit for taking steam samples from turbine machinery and subsequently analysing them for gaseous impurities. There is also an optical device for measuring the dilation at the bore of a steam turbine rotor due to stress while the turbine is running, and this is arranged as a demonstration.

Elcontrol

Photo-electric switches and temperature controllers are featured on this stand. Included is infra-red equipment to give immediate fuel cut-off should flame failure occur in a furnace.

E.C.C.

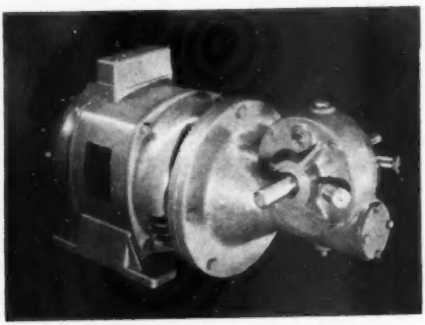
The Electric Construction Co.'s 5 kVA continuity set, which is the principal electrical exhibit on this stand has a three-phase synchronous induction motor suitable for operating as an alternator when driven, and a Lister cold-starting vertical diesel engine. An "Eccosyne" automatic synchronising device controls paralleling with the public supply.

E.D.A.

Electronics in its application to industry has been selected as the theme of this year's E.D.A. stand. Featured is a model working layout of an industrial conveyer system for handling castings, while other applications of electronics as an aid to productivity are shown by photographs.

Electrical Power Eng., Co.

Flameproof motors are prominent on this stand, notably single-phase repulsion induction



This geared motor is one of several being shown by S. E. Opperman

motors of ½ and ¾ h.p. with integral switches. These are suitable for petrol pumps. There are also d.c. electric vehicle motors including a cut-away model of a 7 h.p. unit, and examples of flameproof contactor starters.

Electro Dynamic Construction

Ward-Leonard variable voltage and frequency motor alternator equipment shown on this stand comprises a 10 kVA 250/100 V alternator, 25/65 c/s, with a suitable m.g. set with automatic voltage equipment. A fully automatic control panel with an electronic servo-regulator accompanies the equipment.

Electro-Mechanical Manufacturing

An automatic o.c.b. unit and a range of switch fuses are shown here, together with a small motor starter cubicle having front and rear access.

George Ellison

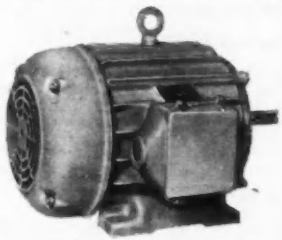
Switchgear displayed on this stand includes a 660 V, 2,400 amp o.c.b. with slide rails for horizontal isolation, and a recently modified oil-cooled rotor starter for slip-ring induction motors. New features of the latter are a totally enclosed top and provision of a thermostat to prevent overheating. A special display feaures cable end couplings.

Erskine, Heap

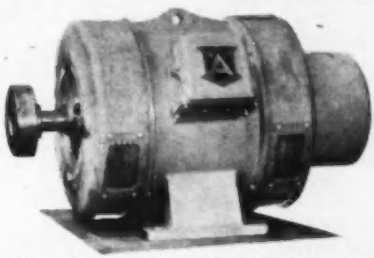
A new range of e.h.t. switchgear is shown on this stand. On view is a complete 11 kV, 150 MVA breaking capacity unit, together with an 11 kV, 250 MVA c.b. fitted with a special arc control device. Another item of particular interest is a metal-clad vertical isolation unit, available in 400 V, 25 MVA and 3·3 kV, 50 MVA designs.

English Electric

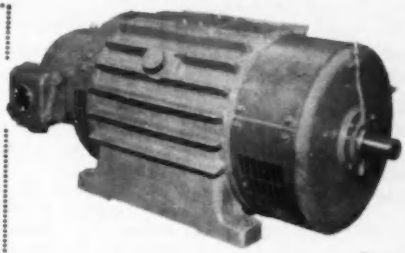
Examples of three types of industrial motors are shown. There are totally enclosed fan-cooled



Crompton-Parkinson "Klosd" squirrel cage motor which complies in all respects with B.S. Draft C.N. Elect. 6814



Above is a motor by W. H. Allen, while below is seen the B.T.H. "Stavolt" self-excited alternator



s.c. motors to the draft B.S. specification, flame-proof fan-cooled motors, and a.c. motors designed specially for crane, hoist and lift work.

Eversbed and Vignoles

Outstanding new product on this stand is a miniature recorder for use with process control apparatus. It is a moving coil milliameter which records its position by a high speed tapping mechanism using an inked ribbon. Damping is adjustable. There is also a new addition to the "Megger" range, a 5 kV mains voltage operated unit stabilised against voltage variation.

Fibreglass Ltd.

Applications of Fibreglass to both heat and electrical insulation are prominently featured here.

General Electric Co.

The wide range of electrical accessories and machines for shipboard services are displayed on this stand.

Harland and Wolff

Occupying the whole of one of this firm's stands is a large eight-cylinder four-cycle turbo-supercharged diesel engine coupled to a 1,230 kW, 333 r.p.m. alternator. This set is one of several ordered for Blackpool power station.

Hoover

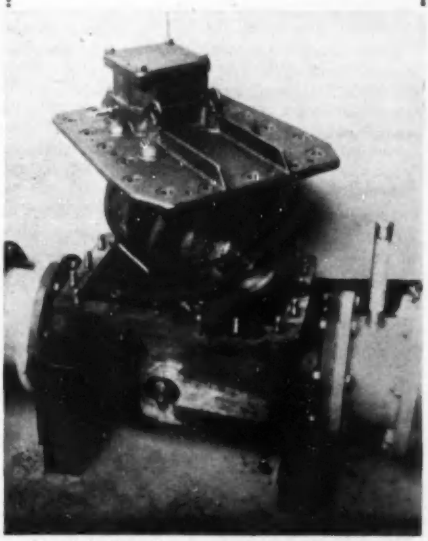
The full range of the company's f.h.p. motors is on show at this stand, in drip-proof and totally enclosed designs. Also shown are stator/rotor units of both split-phase and capacitor start types.

James Howden

Models are prominent on this stand, and amongst the apparatus thus represented is the Howden-Ljungstrom rotary regenerative air pre-heater, together with the Centicell dust collector and the Howden Multi-Vortex dust collector.

Imperial Chemical Industries

I.C.I.'s Plastics division stand shows two modern developments of the chemist to aid the engineer. These are "Fluon" polytetrafluor-ethylene for gaskets, rings, etc., and nylon as applied to mouldings. The Metals division features condenser tubes and cooler tubes amongst its exhibits for a wide range of engineering applications.



Drysdale 7 in./4 in. capsule transformer oil pump opened up at rest

International Combustion

In addition to boiler models, there are on view here exhibits of the type "L" louvre travelling grate stoker, and of the "USCO" plate type air-heater. The Riley Stoker Co. is represented by a working arrangement of Syntron electric vibratory equipment.

Johnson, Matthey

Demonstrations of the low temperature brazing of silver alloys are offered by this firm, which is also showing components for resistance welding and for chemical plants.

Lancashire Dynamo

Six companies of the group exhibit on the two stands that have been taken—Crypton Equipment, Foster Transformers, L.D.C., L.D. Electronic Products, L.D. Switchgear and Nevelin Electric. The central feature is a composite working exhibit demonstrating the comprehensive engineering service of the group. This includes a Foster voltage regulating transformer, delivering three phase a.c. to a six phase single anode grid controlled rectifier, with the d.c. output automatically stabilised by a magnetic servo control. Two d.c. motors are supplied by the rectifier, with their speeds maintained constant through an electronic field control unit.

Laurence Scott and Electromotors

Scale models of more than 50 a.c. and d.c. motors manufactured by the company attract the attention here. In addition there is a working model Scott "Selector" winch in which both the physical characteristics and electrical performance will be represented to scale.

Mawdsley's

Engine driven alternator sets from 3 kVA to 200 kVA are the main feature of this stand. Most of the alternators are three-phase four-pole fully compensated machines, but the 3 kVA example is an exception, being of the single-phase rectifier compounded type.

Metropolitan-Vickers

The remarkable control desk exhibits on this stand are mentioned elsewhere. Other items of interest include the type "MC" fuse-switch, which finds application in medium voltage circuits where fuses are found to be more suitable than circuit breakers. There are some notable models, as well, representing a 120 MVA, 275 kV transformer, and a 40 MVA synchronous condenser. The latter shows the unusual "break-down" design adopted for easy handling.

Micanite and Insulators

Mica in its natural state and in processed form is to be seen on this stand. Included in the display are two examples of high voltage bushings. One a 275/300 kV re-entrant design as used on transformers for the Super Grid and the other a 33 kV metal-clad switch-gear socket bushing.

Mond Nickel

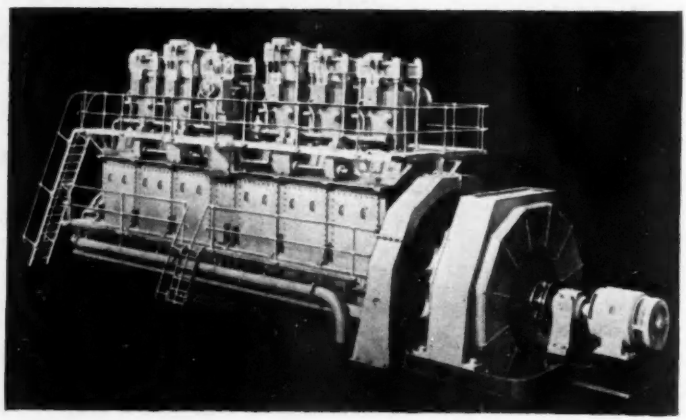
Spheroidal graphite cast iron is the subject of this display. This product has the good qualities of ordinary cast iron, but it very largely eliminates the brittleness which has hitherto restricted the usefulness of grey iron castings.

Monsanto

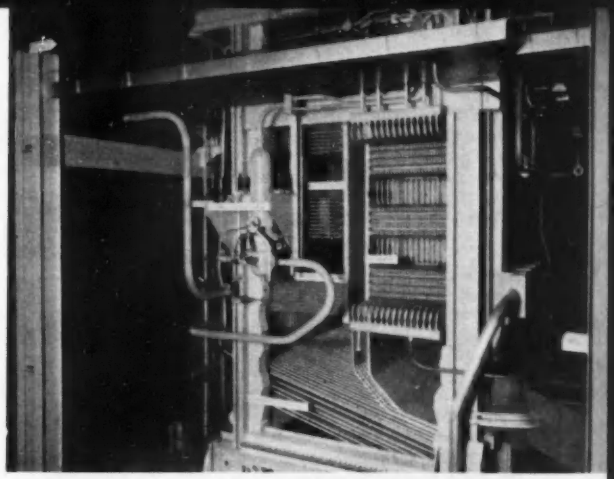
Silester O is a product of this chemical concern which is on display because of its importance in the manufacture of rammed monolithic linings for high frequency furnaces. There will also be a demonstration of the efficiency of the Aroclors as a non-inflammable fluid and as heat transfer media.

Morgan Crucible

Carbon for the electrical manufacturing industry is well represented on this stand in the display of brushes and brush holders and of metal-carbon contact tips for controller and con-



Working model of a Harland & Wolff industrial alternator set driven by a 6-cylinder opposed piston engine with exhaust driven turbo blowers developing 2,850 kW



This view of a boiler model shown by Babcock and Wilcox shows superheater and economiser details

tactor applications. Another interesting feature is the selection of "Reservoil" sintered metal bearings.

Mullard

Shown here for the first time is an invertor equipment for electronic speed stabilisation designed to be used with induction motors. It is shown in use to ensure precise synchronisation of the speeds of four three-phase teleprinter motors. Ultrasonic equipment is prominent amongst other items on view.

Newman Industries

A recent addition to the company's range now shown is an industrial type induction motor available in outputs from 20 to 200 h.p. Slip ring or squirrel cage designs are available, with drip-proof casing. Another notable exhibit is the barrel type flame-proof motor, which can be rolled along the pit road into position.

Newton Victor

Specially developed radioactive isotope containers embodying unusual remote-control facilities are shown. An industrial type container is on view which can carry 1 curie of cobalt without the tolerance dose being exceeded on the surface. Another interesting exhibit is a 150 kV peak industrial X-ray unit in which tube and transformer are insulated with sulphur hexafluoride gas.

C. A. Parsons

Emphasis on this stand is on the company's transformer work. A 120 MVA, 275 kV unit is represented by a model, but available for inspection on the stand are the core and windings of a 750 kVA, 11 kV/433 V outdoor type transformer, and a complete 150 kVA mining type transformer built as a transportable substation unit. In a different category is the firm's infra-red gas analyser.

Ransomes, Sims and Jefferies

Electric tractors and portable trucks are prominently featured here.

A. Reyrolle

Central feature on this stand is a 33 kV vertically isolated duplicate busbar switchgear unit. This is provided with a 1,200 amp, 750 MVA o.c.b., having two breaks per phase. High pressure butt contacts are used, and there are turbulator arc control devices. On a duplicate busbar panel there are six possible positions connecting the feeder circuits and either busbar to each other or to earth, and the whole unit is specially designed for rapid change from one position to another.

Richardsons, Westgarth

A collection of models of steam and oil engines is on view on this stand. It includes a model of a Richardsons, Westgarth-Brown Boveri 52·5 MW turbo-alternator.

Ruston and Hornsby

The gas turbine driven alternator which this firm is demonstrating in operation has already been described.

Sharples Centrifuges

Of particular interest here is the portable oil purifier which incorporates an open-type super-centrifuge together with suction and discharge pumps and an electric oil heater. This is suitable for use with transformers and, in its stationary form, in power stations.

Serck Radiators

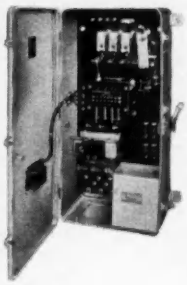
Designed as a heat exchanger between the oil and water circuits of industrial engines, the Serck guided flow cooler, shown here, is a light-weight unit suitable for engines of ratings up to 150 h.p. Another new exhibit is a secondary surface heat interchanger incorporating ribbon wound tubes and suitable for cooling large electrical transformers.

Shell Mex

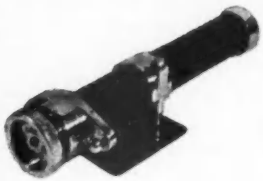
Radioactive isotopes in their application to engine wear are demonstrated on this stand, possibly for the first time in public in any country. Engine wear is electronically calculated and the result transmitted to a continuous recording graph while the engine is running.

Sigmund Pumps

Amongst the models on this stand is a representation of the battery of six 33 in. × 30 in. circulating pumps to be installed at the Connah's Quay power station. New types of centrifugal pump are also shown.



On the right is seen a high tension fuse using a Tufnol tube for the holder. Below it is a view of the casing and filter from the Serck Radiator display



The Brookhirst model above is a straight-on starter for a 27½ h.p. 400 V motor. On the right is seen a George Ellison rotor starter featuring a new totally enclosed top protecting the starting mechanism

Small Electric Motors

Included in this display are single and three phase 60 c/s motors built to Canadian Standards Association requirements. Sectioned motors are exhibited to show internal construction, while amongst the more specialised products on view are super-silent fan motors.

Smith's Industrial Instruments

A new feature presented by this firm is heavy industrial Desynn remote indicating equipment in flameproof housing. Also in the class of automatic control gear for danger areas are intrinsically safe electric remote indicating tachometers. Of application to conveyer systems is an automatic speed control switch which shuts down the driving motors if speed exceeds preset limits.

Stewarts and Lloyds

The principal display on this stand is devoted to boiler tubes, both seamless and electric resistance welded, and to manipulated pipe work for high pressures and temperatures.

Stream-Line Filters

Included in the range of filters exhibited here is a fully mobile unit for the purification and dehydration of insulating oil from switchgear and transformers.

John Thompson

Of notable interest here is a pressed boiler drum end, 5 ft 6 in. in diameter by $3\frac{5}{16}$ in. thick. This will eventually form part of a steam drum for one of the six 540 klb/hr boilers which the company is erecting at Tilbury power station. Also on show is a range of high pressure steam pipes.

Tuscan Engineering Co.

Amongst the standard and special purpose electric motors shown here is a range of flameproof machines from ¼ to 5 h.p. and a new range of f.h.p. capacitor and split-phase motors. Also of interest is a 15 in. flameproof fan unit.

Tufnol Ltd.

Accent on the larger types of component made in Tufnol is apparent in this display. Included are electrical insulators, a cable drum, a high-tension fuse holder and a multi-way terminal board.

C. C. Wakefield

A mobile unit designed to give action displays of mechanical oil and grease units is demonstrated on this stand.

Henry Wiggin

Corronel B, a recent addition to the Henry Wiggin range, is the principal newcomer on this stand. It is a corrosion resisting nickel-molybdenum alloy being produced in this country in wrought form for the first time. The well-known Nimonic range of alloys is also represented.

G. and J. Weir

Direct acting pumps for boiler feeds are represented in the full scale exhibits here. Amongst

models on view are a boiler feed regulator, a turbine-driven feed pump and a twin shell condenser.

Westminster Engineering

Detectors for a voltage range from 200 V to 60 kV are included in the display on this stand. Vacuum tube and air condenser types are on view.

Worthington Simpson

Pumps of the company's "Monobloc" construction, in which pump and motor are combined to form a single balanced unit, are exhibited here in various sizes, the full manufactured range extending from 3 to 1,200 g.p.m.

Welding

There is as usual a good selection of new machines and improved control equipment in the welding section of the exhibition. A1 Electric Welders, who are featuring flash-butt welders, are showing a new range of general-purpose equipment in this category, and this includes a new automatic control equipment for pre-heating, flashing and forging. There are also automatic strip welding machines for the steel industry.

ASEA Electric Ltd. on their stand show the "three-in-one" resistance welder, which with the use of interchangeable heads provides longitudinal and circumferential seam welding and spot welding from one machine. This machine can be air-operated or foot-operated, and can deal with the longitudinal welding of tube down to 3 in. diameter. On the Fusarc stand the company's manual continuous welder is demonstrated. This uses a continuous electrode permitting welding currents of up to 600 amp in some conditions. Speed is the feature of the machine, a 3/16 in. horizontal-vertical fillet being deposited at 17 in. per minute. Also to be seen on this stand is a self-propelled Unionmelt machine.

On the Hirst Electronic Development stand the exhibits include a welding controller with an infinitely variable range from 1/25th of a second to two or more seconds. The accuracy is of the order $\pm 2\%$ and the operational speed 160 welds/minute. There is also a controlled synchronous mechanical contactor for spot and seam welders. In this contactor make and break points are phased specially. Lincoln Electric Co. is presenting a new stud welder. This is powered by one of the company's 400 amp motor generators, and allows a range of studs from 3/16 in. to $\frac{1}{2}$ in. to be deposited. When not in use for stud welding, the generator can be used for arc welding without adjustment.

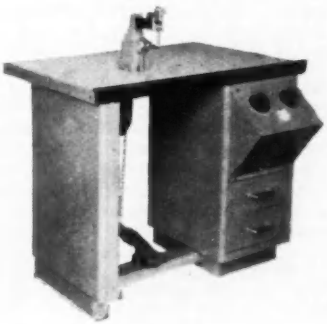
Another firm which is exhibiting stud welding equipment is Crompton Parkinson Ltd. who are represented by the newly formed Crompton Parkinson Stud-Welding Organisation. Both Nelson and Cyc-Arc stud welding systems are demonstrated on the stand.

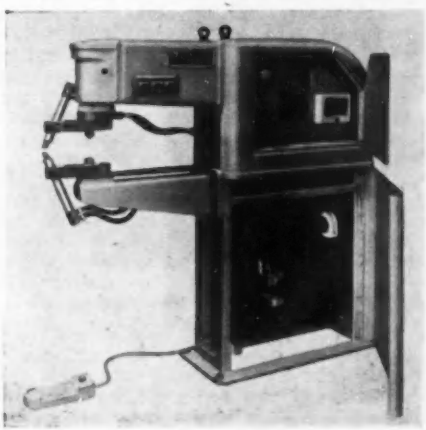
Metropolitan-Vickers Electrical show on their welding stand a 10 kVA spot welder which is a new development, designed as a high speed air-operated machine for the sheet metal industry. Also exhibited is an advanced design of a.c. inert arc welding equipment, in conjunction with which a surge injector unit is demonstrated.

Murex Welding Processes are presenting a new arc welding generator with drooping characteristics and a current range of 15 to 300 amp. A new brush shift principle is incorporated in the design of the generator. Amongst several other new exhibits is the Murex "Coilex" electrode for use in automatic welding machines. On the New Process Welders stand the outstanding new machine is a butt welding unit for copper rods. For $\frac{1}{2}$ in., $\frac{3}{4}$ in. and $\frac{1}{4}$ in. rods the respective current requirements are only 20, 40 and 65 kVA respectively.

Amongst the exhibits presented by the Quasi-Arc Co. that of outstanding interest is a single-operator welding set using a selenium plate metal rectifier. The set is fan cooled, and gives stepless control of current over the range 25 to

Below is a Hirst Electronic precision welding equipment, with on its right the 25 kVA air-operated Metropolitan-Vickers spot welder, which has its doors open to show accessibility





375 amp. On the Reyrolle stand, three single-operator arc-welding sets with a.c. motor drive are shown. These include a 300 amp set with concentric dual control, whereby the most suitable current for a particular welding run is selected on the outer hand wheel while the inner knob is used to give adjustment for the particular welding conditions involved.

The S.M.C.100 stitch and pitch spot welding machine to be seen on the Sciaky Electric Welding stand incorporates new features in automatic pressure control and stitch speed control. Welding speeds up to 120 spots per minute and electrode pressure up to 1,750 lb are obtainable.

Diesel Engines

One of the notable features of this year's exhibition is the number of diesel electric equipments on view, not only for stationary applications, but also for traction purposes. The English Electric Co., for instance, are showing both types. For the first there is a 260 kW set which has been used for civil engineering sites to give a 400 V 3-phase supply. From the traction field there is the prime mover of a 1,500 h.p. locomotive, comprising a diesel engine and close coupled main and auxiliary generators. The engine will operate over a 420-850 r.p.m. speed range, and has a four-stroke cycle, with 10 in. bore 12 in. stroke cylinders.

On the B.T.H. stand control gear for diesel-electric ship drives is shown, as is the case with Metropolitan-Vickers Electrical. W. H. Allen show a 500 kW diesel-alternator which has already been mentioned, while on the R. A. Lister stand there are examples of direct drives.

Naturally, oil engines figure prominently on the Brush group stands. There is a five-cylinder 70 kW version of the McLaren marine diesel-generator coupled to a British alternator—a combination prompted by recent interest in the use of alternating current for ships. Mirrlees, Bickerton and Day, another member of the group, also show a marine auxiliary set, this time a compact medium speed unit coupled to a 225 kW d.c. generator. A new 60 b.h.p. Petters unit is shown for the first time.

Crossley Bros. are another firm who are exhibiting a diesel-electric traction power unit. That shown develops 1,380 b.h.p. at 650 r.p.m., the engine being a six-cylinder V type. This engine mounted Metropolitan-Vickers generator.

Davey Paxman and Co. include in their exhibits another rail traction unit, this time for direct drive with a rating of 1,500 b.h.p. Harland and Wolff present a model of an alternator set driven by a 6-cylinder two cycle opposed piston engine.

Miscellaneous

Pipe and tube bending machines are shown by four exhibitors. A1 Electric Welding Machines have a pipe heating machine on view, which can be used before bending operations. Hilmor Ltd. show several hand operated and

Murex Type 375 arc welding transformer

motorised tube bending machines, including a recently introduced portable rotary hydraulic machine to bend up to 2 in. electrical conduit. Lawler Ayers and Co. also show an hydraulic bending machine for conduit up to this size.

Finally in this quartette comes Major, Robinson and Co., who are showing a heavy duty tube bending machine which is the latest introduction to their range. It will handle hot-finished seamless steel pipes up to 4½ in. outside diameter, over ¼ in. thick.

Copper and copper base alloys for the electrical industry are shown by Thomas Bolton and Sons, including a cellular conductor as used for e.h.t. bus-bars in outdoor substations. Metalock Ltd. are exhibiting their locking strip device in use for some actual repairs. T.I. Aluminium Ltd. feature the uses of aluminium and aluminium alloys in extruded sections. Frys Metal Foundries Ltd. are exhibiting solders, fluxes for all types of soldering work.

Bearings for a variety of machinery uses are shown by Chas. Auchterlonie and Co. Oil retaining bushings and bearings are to be seen on the Bound Brook Bearings Ltd. stand.

Worm reduction gear units for motors in the range 1/20 to 20 h.p. are shown by S. E. Opperman Ltd. Opperman Gears Ltd. have on view "Oppigear" products comprising single, double and triple reduction helical and spur geared motors, as well as independent gear units.

To round off this necessarily brief review of the exhibits, mention may be made of the forced lubrication pumps being shown by Drysdale and Co., electronic control instruments by Honeywell-Brown, and combined electric motors and pumps by Girdlestone Pumps. From British Rototherm come temperature indicators, and the Rawlplug Co. is showing a drill hammer for converting the rotary motion of an electric drill into a percussion tool. Finally, for this is a marine exhibition, Service Electric claim the privilege of showing the only electric ship's whistle.

NOTES ON WIRING by Megohm

Cinematograph Regulations

CONDITIONS under which film and television shows are presented to the public are governed by the requirements of the Cinematograph Act 1952 which are statutory and licensees are required to observe. New Regulations are being drafted and these will probably follow the general lines of past Regulations including provision for the presentation of television projection and shows using non-inflammable film.

When inflammable film is used today the projection room and the re-wind room must be separate rooms of substantial and fire proof construction positioned outside the auditorium. The lighting of these rooms must be by electricity and all lighting fittings used should be of the totally enclosed type. The equipment and guards in projection rooms must be so designed to prevent the lodgement of any article upon them and under no circumstances must the surface temperature of such equipment and guards be allowed to rise to a temperature of more than 212° F. The projectors must be connected to separate circuits which are not connected to the general lighting system.

Auditorium Regulations

Control switches for the general lighting system in the auditorium and parts of the building to which the public have access should not be positioned in the re-wind room or any room where film is stored. No electrical equipment other than that required for the lighting and heating of re-wind rooms may be positioned in these rooms and all metal work must be bonded and earthed.

The general lighting of the auditorium and areas where the public have access should be good and control switches provided which are accessible to the staff to enable full lights to be brought up at once when necessary.

All 'Exits' or 'Way Out' notices must be lighted from the general lighting service and also illuminated by the safety lighting system. Safety lighting should be adequate to enable the public to see their way out of the building in the event of the failure of the general lighting system. The wiring and equipment of the safety lighting system must be completely separated from all other services and the controls for this system should not be accessible to the public. When a storage battery is provided for supplying the safety lighting system it must be able to supply full load for over 2 hours and must be fully charged before the public are admitted.

Auxiliary Plant

For exterior electric signs and advertising illuminations on the frontage a control switch should be located in an accessible position on the outside of the building to enable the staff and firemen to completely disconnect the supply to such equipment in an emergency.

No wiring other than that essential for the operation of the ventilation plant should be run in fresh air inlet ventilation ducts and lighting fittings and totally enclosed motors must be used in all ducts.

Where generating plant and transformer substations are situated on the premises this equipment must be housed in a separate fire proof enclosure or enclosures, from which there is not direct access to the auditorium or exits used by the public. When the transformer substation is operated by the supply authority the licensee will be required to produce a Certificate each year stating that the control and protective equipment within the Substation is in good order.

Earth leakage protective devices are required on main and sub main circuits except where the earth leakage current for the circuit is greater than the current necessary to operate the overload protection.

For television shows the prospective fault current of television equipment at a voltage in excess of 650 V should not exceed one ampere and the applied voltage should not exceed 150 kV. Provision should also be made for the automatic disconnection of the supply in the event of the temperature of the television projector casing rising to 140 ° F.

When non-inflammable film is used and the seating capacity is limited to 400 with not more than 3 performances being given in any one week, no restriction is placed on the method of supply to the projector and a switch control for general lighting in the auditorium is not compulsory.

Automatic Atmosphere Sounding

New "Radar Sonde" System utilises Secondary Radar

INCREASED operating heights of modern jet aircraft make an accurate knowledge of weather conditions in the upper air essential. Not only can such information be used for any one flight, but it is required for general planning of aircraft routes, aircraft design and, by no means unimportant, general weather forecasting.

An important advance in the methods by which atmospheric conditions at great heights may be observed has been made in the development of what is claimed to be the world's first fully automatic radar meteorological system. The equipment, shortly to go into operation at a new meteorological station at Crawley, relies for its accuracy and increased range on secondary radar transmissions from an airborne unit.

At present the radio sonde system finds the greatest use in observing or sounding upper-air conditions. Briefly, this system utilises an airborne sonde unit, suspended from a hydrogen-filled balloon, whose position is followed by a ground radar unit. From the time delay of the reflected radar signals, together with elevation and azimuth angles of the radar aerial, the drift of the unit, and hence wind velocity in the atmosphere can be computed. To follow the sonde unit, however, to its extreme range at which the balloon bursts necessitates transmitting power of such excessive values as to place the scheme beyond the limits of practicability.

Here is seen the aerial unit, showing the two Yagi arrays from which signals are sent to the sonde unit and the paraboloidal reflector at whose focal point the nutating receiving dipole is mounted

Airborne Radar Unit Used

In the new system—radar sonde, developed and built by Mullard Ltd., in collaboration with T.R.E., for the British Meteorological Office—recourse is made to a secondary ultra high frequency transmitter housed in the airborne unit. Primary transmission of an interrogating pulse from a ground unit at 152·5 Mc/s, triggers the secondary transmission in the 10 cm waveband, from the airborne unit. This signal is received by a paraboloidal reflector at the ground unit, which is used not only for computing wind velocity but to enable the reflector aerial to follow the airborne unit automatically.

From the transit time of the pulse to and from the transponder may be determined the slant range of the airborne unit, which together with azimuth and elevation angles of the aerial array provide means to determine the unit's position in space. Wind velocity is then computed continuously and automatically from these parameters.

Two types of airborne unit will be available, one for determining wind velocity only, the other, the sonde unit, incorporating elements to measure pressure, temperature and humidity. These measuring elements are common to both the new system and the radio sonde system. In the latter information is telemetered using a tone transmission varying with the parameter in question and modulating a carrier wave of radio frequency. Radar sonde, however, utilises the 10 cm waveband as a carrier for the information, intelligence being in the form of a second pulse whose distance in time from the range pulse determines the value of the parameter being measured.

Electrical Accidents at Home

Home Office Summary Analyses Causes of Fatalities

FORTY-TWO people died in English homes during 1952 as a result of accidents with electrical wiring and apparatus. Small though this total is compared with that from other causes, an inspection of the causes of the accidents confirms that most of these tragedies need not have occurred. A brief summary of each has been prepared again this year by Mr. H. W. Swann, who, besides being H.M. Chief Electrical Inspector of Factories, serves on the Interdepartmental Committee on Accidents in the Home.

Bathrooms Again

Bathrooms again took their toll during 1952. Six fatalities are recorded, three involving fires, two towel-rails, and the remaining one a hair-drier. In one of the electrically-heated towel-rail incidents connection was made with a three-core flexible to a lampholder adapter. The earth core had been cut off short and was pressing on the live pole of the adapter. In the other instance, the towel-rail was a portable type which had been privately installed. A three-core flexible was used, but was connected to a two-pin plug with the result that the rail was not earthed. When a fault to frame had occurred, a man taking a bath touched the rail and was electrocuted.

Fatal accidents occurring while using electrical appliances were fifteen in number. No common pattern emerges, but as usual attempts to repair appliances without disconnecting them from the supply figure prominently. In this connection the fatal fascination of scissors as a repair tool again had its effect. By and large, however, damaged or badly constructed appliances and accessories, lack of earthing and crossed polarity were the prime cause of trouble.

Earth Loop Resistance

There were two technically interesting exceptions. A woman who was emptying a 3 kW electric washboiler whilst the current was switched on received a fatal electric shock, although she was standing on a lino-covered stone floor. The washboiler was earthed by an 18 in. copper rod driven into the ground, as there was no water supply to the premises. On measurement, the resistance of the earth electrode was found to be 75 ohms, while the neutral of the supply transformer (two electrodes in parallel) had a combined resistance of 8 ohms. The current rating of the circuit fuse was 12 amps (minimum fusing current 22 amps), so it could not blow. In another fatal incident a young man in a roof space was standing on a sheet of metal laid across the rafters as a platform. The man was electrocuted, and it was later found that the metal sheet was live because it was touching an isolated length of conduit containing defective wiring.

TYPE OF APPLIANCE INVOLVED

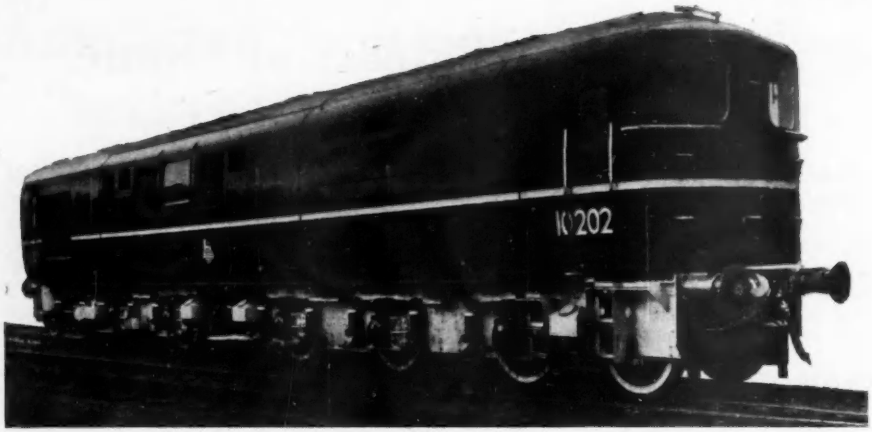
Faulty wiring	7
Faulty wiring (lamps)	6
Electric fires	6
Switch sockets	4
Electric irons	3
Electric kettles	2
Electric cookers	2
Plugs	2
Electric towel rails	2
Vacuum Cleaners	2
Electric drill, boiling ring, hair-drier, power cable, washboiler and wireless transmitter ..	6
	42

Six accidents were caused by portable lights, two of them involving makeshift extensions to garden sheds, in other cases faults at connectors and in flexes.

Socket Troubles

This analysis leaves eight accidents unaccounted for, which must come under the heading miscellaneous. Amongst them was a case involving a mains electric switch. It was being dusted with a damp cloth when a shock was received by the housewife concerned. It was found that there was an accumulation of dust and damp fluff at the cable entry, and it was possible to receive a shock while cleaning the porcelain base. In another incident a 2½-year-old child inserted a three-pin plug into a shuttered socket outlet and was electrocuted. From burns on his fingers, it appears that he must have grasped the pins of the plug. These became live when they were inserted for ¼ in. into the socket, and this left ¼ in. of live metal.

In another incident a masseur holding a correctly earthed vibrator machine touched the reflector of an infra-red heater. This was not earthed, and had a fault to frame, so that the masseur received a direct shock from line to earth.



Diesel-Electric Locomotive Tests

COMPREHENSIVE tests have now been carried out on the performance of the English Electric diesel-electric locomotive No. 10202 and are reported in Bulletin No. 9, available from the Railway Executive, 222 Marylebone Road, London, N.W.1. (10s.).

The tests were carried out on the Waterloo to Exeter line, and utilised the Western Region dynamometer car.

No. 10202 is a 1 Co-Co 1 locomotive, powered by a 1,750 b.h.p. 16-cylinder vee-type turbo-pressure-charged diesel engine type 16SVT/1. This engine drives a main generator with a continuous rating of 1,155 kW, 1,650 amps 700 volts and a one hour rating of 1,155 kW, 1,750 amps, 660 volts. The maximum current is 3,000 amps. Excitation is provided by a 45·9 kW (340 amps, 135 volts) auxiliary generator, overhung on an extension of the main generator shaft. Six traction motors type EE.519/4D, series wound, are installed driving the axles through gears. As originally delivered the gear ratio was 52/21 and one stage of field weakening was employed. Operating conditions requiring more acceleration caused these to be altered and at the time of the analytical trials the gear ratio had been changed to 65/17 and two stages of field weakening introduced.

Tests Results

The tests were carried out in two sections. The first were in the nature of observational tests on revenue earning trains to obtain average performance and efficiency in representative service. The second were analytical in character.

In the service tests, the trains were punctual in arrival at destination on each occasion with one exception caused by a restriction and signal check. Working in Notch 8, the highest notch, was required by the schedules for these loads for most of the time that the locomotive was under power. The fuel consumption curves, however, showed that sustained working in Notch 8 was fully justified. Although the modification to gear ratio and additional field weakening had not been introduced, it was considered that the test results were fairly representative of the locomotive as it now stands.

In the analytic tests, it was found that the maximum measured output of the main generator was 1,145 kW at 635 volts, 1,803 amps in the weak field of Notch 8 at a train speed of 42 m.p.h. Under these circumstances the combined output was 1,190 kW. Taking into consideration, the losses, the brake thermal efficiency worked out at 31·1%. At 36 m.p.h. in the intermediate field of Notch 8 a figure of 33·4% was attained.

While the full load output efficiency is somewhat lower than that specified by the makers (32·5%) it is emphasised in the bulletin that after 3,890 engine hours without attention to matters which might affect output and efficiency a tendency in this direction would be expected.

In conclusion it was stated that the tests showed the high overall efficiency to be expected when a diesel prime mover was used and that the efficiency was maintained over a wide range of train load and running speeds, thus making the locomotive very suitable for mixed traffic working.

PROBLEMS AND PRACTICE in Engineering

Spurious Earths

THE contribution by "J.R." on "The Elusive Earth" (in the issue of April 23) served well as a further warning against (as he called it) "the unqualified assumption of the electrician and inspector that every water-pipe provides first-class earthing." It is still not generally realised that the earth-continuity system of an installation should be mechanically and electrically solid, not added as a kind of afterthought but treated as seriously as insulating the live parts. Unfortunately, even many a good system is connected to an "earth" which (like the pump's water-pipe in J.R.'s account) is far from being in effect the general mass of earth.

So it comes about that though one meets many "earths" which are good because connected to a widespread underground water-supply system of metal, their genuineness may have been assumed. And there are also met a variety of pipe "earths" ranging from good to bad and terrifying. The water-supply system may be little better than a surface one to a few country cottages. Or the pipe offered as earth may no longer supply water and be cut at a point just out of sight. Or the pipe may be supplying gas, or discharging waste!

Because any piece of metal in the earth may serve (or be imagined to serve) the purpose of radio or of an earth-leakage switch, metal stakes and lengths of conduit driven into the ground (even nails inserted in a wall) have been trusted. Assumed earths of another character (better on the face of it) are those already existing in the shape of ironclad gear, plant, tubed installations and earth-continuity conductors; and above-ground conductors running down to plates (*themselves* efficient) sunk in ground or pond or river but from which they may have broken away.

Much good comes from conscientious and experienced wiremen working on co-operative terms with supply-authority inspectors. Assurance can be given by a physical examination and knowledge of the water-supply services in a neighbourhood. On new work and extensions recourse should always be had to a continuity-tester (or the continuity-range of a special insulation tester); such testing being with d.c. Results well within the 1-ohm limit must be obtained in order to ensure that the limit will not be exceeded on a.c. The installation's earth-continuity having been checked, the continuity-tester can then be used to give assurance of a water-pipe "earth" by tests between it and water-services in neighbouring premises—a heavy water-main being preferably included.

Tests of an earth-electrode by the method of injected a.c. are beyond the average wiring contractor. The supply authority should be better circumstanced, and prepared by one or other realistic test, as well as by technical advice, to give assistance. Certainly in rural districts the problem of earthing arouses more co-operation; and it is also true generally that the supply authority may automatically or by request provide an "earth" at the supply point. Without doubt, such service is to be encouraged.—*G.E.M.*

Soldering Difficulties

ALTHOUGH many wiring accessories such as brass cable sockets, flanges, etc., are marketed ready tinned, it sometimes happens that difficulty arises when carrying out the actual soldering operation. This shows itself by a strong disinclination of the new solder to adhere to the tinned surface. It is perhaps unfortunate that such an annoyance cannot be readily overcome by the user, as the defect is the responsibility of the manufacturer. In most cases care is taken that the temperature of the original tinning solder is correct, but it sometimes happens that due to inadvertance or oversight this is too hot. Under these conditions the overheating results in the zinc in the brass becoming burnt, which in turn quickly kills the solder in the dipping pot.

I have found this difficulty may be overcome by adding a tablespoonful or so of powdered sulphur to the pot just before dipping, which enables a clean, well-tinned surface to be obtained. The sulphur, however, forms a scum which must be skimmed off in the usual manner.—*H.E.*

Contributions to this page dealing with specific items of interest to electrical engineers and maintenance men are welcome, and, if accepted, will be paid for at our standard rates. Problems of a practical nature to which a solution is required will also be considered. Contributions should be written on one side of the paper only and may be accompanied by sketches, which will be re-drawn for publication.

NYLON FOR BELT DRIVES

ALTHOUGH at first sight nylon would appear, due to its great tensile strength and immunity from micro-biological attack, to be an ideal material for belt drives, other characteristics present serious technical problems. Among these are the low coefficient of friction and the high inherent elasticity. However, the major advantages of nylon can be exploited—and its disadvantages minimised—by a composite cotton/nylon combination developed after some eight years of experimental work by Messrs. Lewis and Tylor, Ltd., specialists in the manufacture of solid woven belting.

Constructional Features

The new belt consists of a nylon core with an interwoven cotton cover. Since nylon has a tensile strength three to six times that of natural fibres, it is possible to make the core considerably less in cross-sectional area than in a normal belt. The cotton, which completely surrounds the core, has a high natural frictional coefficient which is further improved by a proofing compound.

A further advantage is that as the stress-bearing material is concentrated on the neutral axis great flexibility is inherently achieved, and this is further improved by the type of weave used in the cotton cover.

As nylon is more elastic than cotton, means had to be found of overcoming the differential stretch. This was done by pre-stressing the nylon and then weaving in the cotton with a high weaving angle. This pre-stressing technique has proved so successful that over a wide variety of drives the stretch is much less than that of other types of belt.

The low friction of nylon presented another difficulty which affected the belt's fastener holding properties. This was overcome by the weaving angle of the cotton cover and the type of binder used. In practice, it has been found that on test the new belt holds fasteners better than any other textile belt.

Wide adoption of this new belt design is at present held up by limitation in the supplies of nylon yarn, but it is hoped that within the next two years this situation will materially improve. The present rate of production is, however, sufficiently high to enable most industries to give the belts a trial.

Electrical Development in Malaya

AN increase of 14·6% in sales over the 1950/51 figure is reported in the Annual Report of the Central Electricity Board of the Federation of Malaya for 1952. This increase has been attained despite the continued shortage of plant at all the Board's power stations and the disorganisation due to the Emergency.

The major work carried out during the year was the erection of the Connaught Bridge station which had some 40 MW of plant commissioned some months ago (our issue of March 26), and it is hoped to complete this plant up to its final capacity of 80 MW by 1955. Development plans for the years 1952-57 include in addition, a new steam station near Malacca, of 30 MW capacity, a doubling of the diesel station capacity, the co-ordination of the Singapore and Southern Jahore systems so that the latter can draw unrestricted supplies from the former, and the extension of the Malay "Grid" from Malacca to Muar. Continued attention has also been paid to the problem of the development of hydro-electric resources, but it will not be possible to begin preliminary work in the Cameron Highlands until the financial and political pictures become more stable.

During the year under review, the first phase of a large expansion of the diesel-electric programme was initiated. Plant totalling some 6,244 kW had been ordered in 1951 and delivery had been anticipated in 1952. In addition to this new plant, transfer of existing plant between stations had been arranged. Many promised deliveries failed to materialise but a substantial part of the programme was completed.

Finance

After charging all revenue expenditure to the revenue or net revenue account, there remained a surplus of $1,678,321 from which $200,000 has been transferred to Insurance Reserve and $1,200,000 to Provision for Dividend on $30,000,000 ordinary stock at 4%. The balance of $278,321 excess revenue has been transferred to general reserve. Fixed assets at 31-8-52 were $67,966,055 an increase of $37,012,518 (or 124%) above the assets taken over on September 1st, 1949. It should be noted that the Straits dollar is worth approximately 2s. 4d.

Emergency Lighting in Hospitals

Lighting Systems, Batteries and Fittings discussed at Hospital Engineers' Conference

IN a paper, discussing hospital emergency supplies, delivered last week at the Institution of Hospital Engineers summer school by R. A. Harvey, B.SC.(ENG.), A.M.I.E.E., recent developments in operating theatre lighting units formed a particularly instructive section. From early attempts of a cluster of lamps mounted over the surgeon's head, doubly disadvantageous by virtue of awkward shadows and discomfort, there have been developed several different types of fitting.

Among those worthy of mention is the Scialytic, or shadowless, fitting housing one centrally disposed main lamp with three auxiliary lamps for emergencies in a common lantern. In view of only one main lamp, the emergency supply must operate not only against mains supply failure but against filament and local fuse failures. For this purpose recourse is had to the series type switch relay, comprising a box, either sunken or surface, enclosing a series relay and d.p. switch. As the relay coil is in series with the supply to the lamp, the relay contacts are held in the off position until any of the three factors fails. One pole of the d.p. switch being in the emergency supply circuit and the other in the main supply circuit enable the switch to be used to control the fitting for normal operation. Symmetrical spacing of the three emergency lamps ensures shadowless illumination during emergencies.

Zeiss Unit

Another modern unit is the Zeiss fitting which contains one central lamp having main and emergency filaments. Arrangements for this fitting closely resemble those for the Scialytic unit, although there is the major consideration that only three leads are taken from the lamp, necessitating special precautions to prevent the a.c. supply from being solidly connected across the battery. Usually a 1/1 transformer suffices to ensure isolation. With the G.E.C. fluorescent fitting, which incorporates five 80 W fluorescent tubes for main illumination and four 100 W metal filament lamps for emergency operation, there is no need to guard against failure of individual lamps. Consequently a potential switch relay is used for emergency purposes, detecting only mains supply or local fuse failures. A fourth type of fitting is the Hanau lantern, of which very few are at present in use in this country, using nine specially focused lamps. Using a "maintained" emergency supply, all nine lamps are normally fed from the a.c. supply through a transformer, automatically changing over to a battery on mains failure. As the failure of one lamp would not seriously inconvenience the surgeon, individual lamp protection is unnecessary.

Types of Battery Used

Earlier in the paper, attention is given to types of battery likely to find use in hospitals for emergency supplies and other purposes. As would be expected, for the former duty the Planté type is found to be most useful, although the low loss type has advantages for electric bells, impulse type electric clocks and similar light duties and the armoured battery is discussed relative to trucks for use in hospitals.

On lighting systems specifically, the trickle charging method of battery control, together with emergency supply switching in through mains operated contactor contacts which close on mains failure, has greatest value. Particularly applicable is the "non-maintained" type of circuit, where the emergency circuit, normally un-energised, is connected to the battery supply instantaneously should the mains supply fail. This system is suitable for all but the Hanau lantern of those described earlier, although no hand switch should, of course, be fitted in circuit to avoid any possibility of it being opened automatically. In the "maintained" type of circuit (usually adopted in cinemas and theatres) emergency lighting is supplied normally from the main supply, transferring to batteries only on mains failure.

As the emergency lighting system operates at voltages lower than mains voltage, allowance must be made in cables for heavier lamp currents or excessive voltage drops will occur. The empirical "2 yards/volt" rule is a useful guide for estimating purposes.

Brighton Control Room

affords comprehensive facilities for both Grid and station operation

THE remote-control equipment installed at the 330 MW Brighton "B" power station incorporates several interesting features. The main transmission equipment covers three substations—two 132 kV substations at Southern Cross and Fishergate and one 33 kV substation at Fishergate. The 3·3 kV auxiliary supply system is also controlled from the station. As a result a considerable amount of equipment is required in the control room itself, and in view of the space considerations miniature telecommunication equipment has been used together with telephone-type multicore cable.

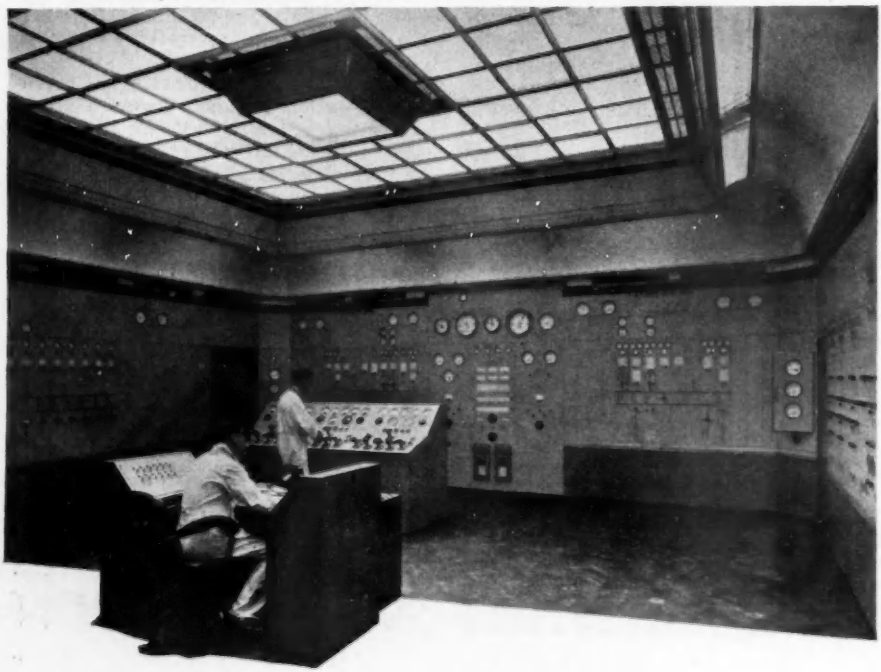
Miniature control equipment of this type can be mounted on panels only 6 in. wide, and flexibility is obtained by the use of sectionalised cubicles and unit construction. Each feeder, circuit-breaker or transformer panel is individually wired and capable of rearrangement with little interference to the remainder of the equipment.

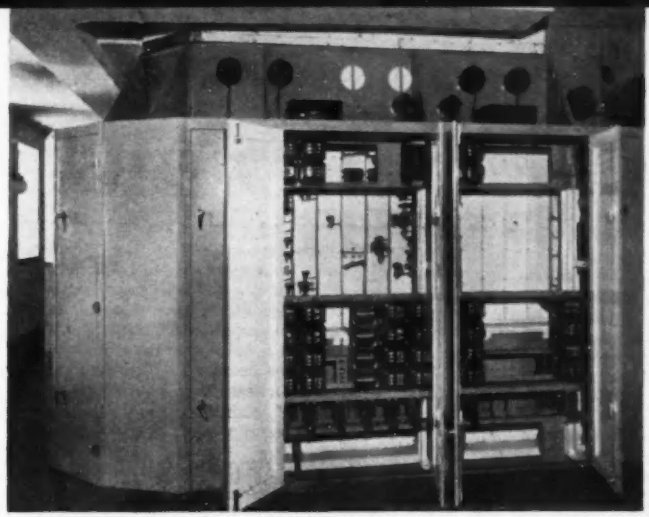
At Brighton "B" the various control boards are arranged to form the walls of the control room. The diagram panels form the front face of steel cubicles, accommodating all the telephone-type control apparatus and fitted with access doors to the rear.

Room Layout

On the left side of the room is the Fishergate 33 kV substation control panel accommodating equipment to control and indicate 15 circuit-breakers including bus-section and bus-connector units. Complete facilities for indicating isolator positions, alarms, meter readings, tap-positions and for control are included. Circuit-breaker and isolator positions are indicated by special two- or three-colour lamp signals displayed through the same aperture thus simplifying

This illustration gives a good idea of the Brighton "B" control room





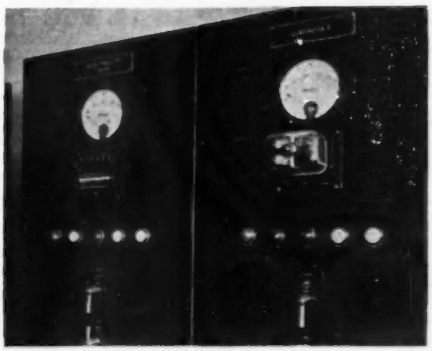
Cubicles housing the control circuits and apparatus. The view is from the rear with the doors opened to show telephone type relays and terminating blocks

the diagram layout. Circuit-breaker position indicators are incorporated in the knobs of the breaker controls. The various meters were specially designed by the Record Electrical Co. Ltd., and are generally direct-reading instruments.

Control for 132 kV

The central suite includes the control panels for the 132 kV substations at Fishergate and Southern Cross; dividing these two panels is a central panel which accommodates the common station alarms, frequency meters, standard clocks, recorders and so on. In the angles between the suites of cubicles are two hinged synchronising panels, so arranged that they can be opened out at right angles and viewed from any position by the control engineer. The 3.3 kV station auxiliary control panel includes control and indications for the three generators, the main house equipment and the harbour pumps.

The control circuits and apparatus are housed in specially designed glass-topped plug-in relay units mounted on frames and wired to individual terminal strips, one for each breaker or transformer. Alterations in the station layout can therefore be made with little alteration to or interference with other equipment. The cubicles are enclosed by means of steel doors and have a meter façade mounted above. Connection with the protection relay equipment or switchgear is carried out by telephone-type multicore cables leading from the terminal strips to specially designed terminating cubicles situated conveniently close to the equipment. These cubicles contain cable glanding and terminating facilities. Solder tag connections are provided for incoming multicore cables and are connected by moulded isolating links to No. 0BA stud terminals which accommodate the VIR-type cables from the protection equipment and switchgear. Where convenient the interposing relay units for switch operation, etc., can be mounted in the cubicles. Elsewhere, however, they are mounted on the generator or inter-connector local control panels, or where convenient.



Two of the local control panels with relay equipment are shown in this close-up

The complete equipment is operated at 50 V d.c. supplied from SenTerCel selenium rectifier equipment maintaining storage batteries of the secondary cell type.

The various control boards which are arranged to form the walls of the control room, together with the co-ordinated architectural features lead to a most pleasing appearance. The main diagram panels are finished eau-de-nil green, and light oak matt-finished wood panels at the base, and corresponding beading below the ventilating ducts relieve the austere appearance.

All the remote-control equipment, including the four sections in the control room, was manufactured, installed, tested and commissioned by Standard Telephones and Cables Ltd., and co-ordination of design was carried out with the S.E. Division.

overseas news

Largest Steam Station in Alberta

Now under consideration by Calgary Power Department, is a proposed $8 million power station for Lake Wabanum, 55 miles west of Edmonton. When completed this would be the largest steam plant in Alberta and would use coal.

Calgary Power now has three projects under construction. One is the natural gas/steam plant at Medicine Hat due this November, the second a 67,450 h.p. hydro station at Ghost River, west of Calgary, and the third the Bearspaw dam project at Calgary which will bring another 22,000 h.p. into use in 1955.

Eisenhower Power Policy Wins

Wide acceptance of President Eisenhower's new power policy that local communities should develop their own power resources, is claimed by Mr. Aandahl, Assistant Secretary of the Interior.

The only exception to this basic principle was the Pacific Northwest but "there was, however, a growing belief that local interests should take over with less dependence on the Federal Government." Reason assigned for the attitude of the N.-W., particularly in the State of Washington, was the Federal Government's role as a major power supplier in past years. Such projects as Bonneville and Grand Coulee in the Columbia River Basin have been supplying the bulk of energy for the power-short Northwest.

Another Dollar Order

The English Electric Co., Ltd., has obtained an order from the Bonneville Power Administration, Oregon, U.S.A., for the supply of a 250 MVA three-phase transformer bank for service on the State's 230 kV transmission system. On the 230 kV winding, on-load tap-changing equipment will be provided. The cooling equipment will incorporate air-blast and forced oil circulation for the full output. The transformer bank will comprise three single-phase units, each complete with oil, weighing 150 tons.

New Station to Supply Cuzco

Reports from Lima, show that a new hydro-electric station is planned at Vilcanota, near Cuzco in southern Peru. Initial capacity of the station will be 20 MW and when completed the station will have a capacity of twice that amount generated by four 10 MW units. A head of water of 115 metres is available. All power from the station will be supplied to Cuzco some 60 km away over 66 kV transmission lines.

The scheme is estimated to cost between 40 million and 45 million soles (approx. £1 million) but as the Cuzco Reconstruction Board can only make available about 12 million soles initially and 4 million annually thereafter, credit terms will be necessary. It is understood that the Reconstruction Board expect the organisation which will tender for the whole project to arrange the financing of the scheme.

British Guiana Development

The latest 38,500,000 dollar, five year programme of development for the colony recommended by a mission from the International Bank for Reconstruction and Development includes the expansion of existing industries and the establishment of new industries and improvements in agriculture, transportation and communications and other developments.

Seventy per cent of the proposed expenditure is to be spent on agriculture, transportation and communications whilst the remainder is set aside for forestry, industrial credits, electric power development and housing in British Guiana.

Power for Norway's Aluminium

First phase in construction of the 280 MW hydro plant at Sunndalsöra between Bergen and Trondheim is nearing completion.

Seven generators are scheduled for the station which is entirely underground and the first two are now ready for trials.

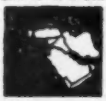
The plant which is being built to provide power for the new aluminium plant at Sunndalsöra utilises a head of 2,627 ft. Cost of the project is estimated at £10 million.

Storfinnforsen on Load

First of the three turbines at the Storfinnforsen hydro-electric station on the Faxälven River in northern Sweden went on load last month adding 35-40 MW to the Swedish Grid system. When all three turbines are on load at present scheduled for next spring, the plant will be rated 100 MW.

Building costs of the station are estimated as 90 million kroner (£6,200,000). The Francis type turbines built by Nydqvist and Holm, of Trollhättan, have an output of 47,000 h.p. each at 150 r.p.m. utilising a head of 158 ft.

Israel Partnership



The Israeli Government has entered into a partnership on equal basis with the Palestine Electric Corporation disclosed Mr. Guri, chairman of the Parliamentary Finance Committee, following recent rumours that the Government intended to acquire a 51 per cent controlling interest in the corporation.

His statement occurred during the debate on the final reading of the development budget for the period from July 1953 to March 1954. This earmarks £I.6,900,000 for power development.

News of the partnership was later confirmed by the Israeli Finance Minister, Mr. Eshkol, who revealed that the Corporation had last year suggested the transfer of the entire company to state ownership but the Government had not accepted.

It is probable that a special type of Ordinary "A" share will be issued to cover Government participation.

Loan for Escom

Two loans, each of $30 million, to the Union of South Africa—one to increase electric power supplies and the other to expand the railway system—have been made by the International Bank for Reconstruction. The Electricity Supply Commission of South Africa is engaged in a construction programme which, by 1958, will add 1,400 MW of generating capacity. This includes eight new power stations and extensions to six existing ones, apart from the construction of some 900 miles of transmission line.

U.K. Chief for S.E.C.?

Reports from Melbourne say that the State Electricity Commission will undergo reorganisation and will get a new chief from Britain after the Premier (Mr. Cain) returns from his visit to England.

It is understood that the Commission will be separated into two authorities—one to control electricity production and the other production of fuel.

Another important change planned is the appointment of full time commissioners instead of part-time members as at present.

Victoria All Electric

The State Government is pushing ahead with plans to make Victoria an all electric state according to the Minister for Electrical Undertakings Mr. J. Galbally.

The supply network now covered two-thirds of the State's populated areas and stretched from Lakes Entrance to Port Fairy in the West and from Bass Strait to the Murray River and into New South Wales.

In the past four years the S.E.C. had connected 100,000 new consumers making a total now of 600,000 whilst the number of farms supplied with power had trebled in the past ten years.

The Commission had a £25 million capital construction programme for this year and immediate power prospects were good. Within the next few months S.E.C. hoped to increase the State generating capacity by an additional 90 MW of new plant and next year they hoped to have on load for the winter a new 50 MW generator at Yallourn. By the time the programme of capital work was completed there would be an installed capacity of 1,300 MW—twice present capacity.

Geothermic Power

In the next stage of schemes to utilise geothermal steam in the Waitakei area, the New Zealand Government has instructed Merz and McLellan, the consulting engineers, to survey the region and prepare a preliminary report and cost estimate for a steam power station with an initial capacity of 20 MW. This information was given last week-end by Mr. S. Goosman, Minister for Works. The consultants are also to assist the Government's engineers in examination of a proposal to produce heavy water and act in an advisory capacity on technical questions which might arise. Reporting on the successful tests in the area, Mr. Goosman said a number of shallow bores were capable of producing at least 20 MW, but in deeper holes of a larger diameter, it was reasonable to believe the discharge might be equivalent to power amounting to 10 MW for a single hole.

It is reported that development will be carried a stage further after a valve has been fitted to the first deep bore. The second bore is down to 3,200 ft. greatest depth so far reached in geothermal drilling, and the third bore has reached 435 ft.

Wiring Rules Revised

The wiring regulations covering domestic installations are, we understand, being revised by the New Zealand State Hydro-Electric Department.

According to reports from Wellington the national housing conference has agreed to a recommendation that the Department should be advised on the desirability of seeing that the revised regulations enable a house to be wired in the most economical way compatible with safety. This recommendation was made by an electric sub-committee who submitted a lengthy report on the cost and methods of installing electrical services.

German Plant for India

The team of technicians from the German firm of Siemens which has been studying market conditions and production facilities for a heavy electrical equipment project proposed by the Government of India is to return to Germany to prepare the scheme which will be submitted shortly to the Indian Government. It is understood that this will provide for the establishment of an economic unit which could be expanded to take care of the bulk of India's requirements of heavy electrical plant. We have previously noted that Associated Electrical Industries of India, the Westinghouse Electric International Co. and the International General Electric Co., have submitted reports on the establishment of a heavy electrical plant industry. It is now believed that Siemens are prepared, in principle, to participate financially and technically in the project.

PERSONALITIES

IN THE INDUSTRY

Following the announcement of the formation of the Stud Welding Organisation, of Crompton Parkinson Ltd., for the unified sales and servicing of both Nelson and Cyc-Arc stud welding equipment, it is now further announced that **Mr. F. Foster,** M.SC, A.M.I.E.E., holds the position of General Manager, with **Mr. R. W. Taylor,** A.M.I.E.E., M.INST.W., as Sales Manager (Home). Mr. Foster was previously General Manager of Crompton Parkinson's "Cyc-Arc" Stud Welding Division which has now been absorbed into the new organisation, jointly with the "Nelson" Stud Welding Division.

Mr. F. Foster

Mr. R. W. Taylor

Mr. R. W. Taylor was previously Product Sales Manager of the "Nelson" Stud Welding Service; and before joining Crompton Parkinson Ltd. he was sales manager to Cyc-Arc Ltd.

It is reported that **Mr. E. Sims-Hilditch,** a former chairman of the Nantwich R.D.C. has been appointed by the Merseyside and North Wales Area Electricity Consultative Council to the No. 3 local committee.

The Minister of Fuel and Power has appointed **Ald. R. Scruton** of York and **Major C. J. Purser Hope,** B.SC.TECH., of Sunderland, as members of the North-Eastern Electricity Consultative Council.

For the recently formed Recording Equipment Division of E.M.I. Sales and Service Ltd., **Mr. Romer Hatton** has now been appointed sales manager. The assistant sales manager is **Mr. R. J. Wood,** and the sales engineer is **Mr. W. H. Y. Grainger.** This new division is responsible for the company's domestic and professional recording equipment.

Mr. Romer Hatton

Mr. R. J. Wood

Mr. W. H. Y. Grainger

We offer our congratulations to **Mr. J. H. Tangye,** eldest son of George Tangye, one of the four brothers who founded the Birmingham engineering firm bearing the family name, on celebrating his 90th birthday last Friday. He was works manager of the firm from 1893 to 1910 and a director until 1930.

Following the recent appointment by the Gramophone Co. of **Mr. A. E. Lawson** as assistant sales manager for radio, television and gramophones, two further sales appointments are now announced. **Mr. C. E. Walker** becomes southern area manager, and **Mr. F. G. Wigmore** is assistant to sales manager **Sidney Davies.** Mr. Walker has been associated with companies in the E.M.I. group since 1926, and was previously sales supervisor for London and the Southern area. Mr. Wigmore joined the E.M.I. sales organisation in1933 and is well known to dealers in the south of England.

We extend our best wishes to **Mr. V. A. Pask,** M.I.E.E., M.I.MECH.E. (Chief Engineer of the B.E.A.) on his marriage to Miss M. J. S. Sear. The ceremony took place quietly in London on Wednesday of last week, August 26.

The resignation of **Mr. A. F. Brown,** from British Electric Lamps, Ltd., reported in our issue of August 20, was not, as we were informed by the company, due to health reasons. Mr. Brown is in good health and is available for another appointment. We apologise for any inconvenience which may have been caused.

Mr. J. W. Stevens, who has served on the board of directors of The Express Lift Co., Ltd. of Northampton and has occupied a managerial position with the company since its formation, retired on July 31.

A visitor to this country from abroad is **Dr. Erik Monten,** head of the Biological Department of the Swedish State Power Administration, who is making a study of fish passes and conservation with particular respect to hydro-electric schemes.

We understand that **Mr. C. G. White,** export manager of the Ever-Ready Company (Great Britain) has been elected to the board of the company. Mr. White joined the firm in 1925 and has held the position of export manager during the last 15 years.

Mr. C. G. White

Mr. A. G. Marsh, the export manager of Agro Electrical Co. Ltd., retired at the end of August. Before joining Agro he held a similar position with T.M.C.-Harwell (Sales Ltd.). His association with the company goes back to the early 20's, and his many friends will wish him a full measure of enjoyment in the years ahead.

The Industrial Electrical Co., Ltd., announce that **Mr. John R. Radington-Meech** has been appointed chairman and managing director, **Mr. Eric Clark** director and secretary, and **Mr. H. Jenkins** director and general manager.

Mr. A. Verdun Smith has been appointed works manager of New Era Industries (Tottenham) Ltd. A methods and production expert, he has been employed for the past 24 years by Marconi's Wireless and Telegraph Co. at Chelmsford.

Mr. E. A. Dorling, A.M.I.E.E., has recently taken up the appointment of senior sales engineer with Ioco Ltd., and will be dealing with the company's electrical insulating materials and "Formapex" laminated plastics. Mr. Dorling is well known in the electrical and mechanical engineering industries, having served them continuously for over 20 years during his association with the plastics industry.

Mr. E. A. Dorling

Mr. J. J. Hammond last week retired from the board of Oldham and Son Ltd. He started with the firm in 1899. After the company's annual general meeting last week, the directors and executives attended a small farewell luncheon given for Mr. Hammond, when he was also presented with an engraved silver salver.

Wilkins and Mitchell Ltd. announce that with the expansion of the "Servis" sales organisation throughout the country, the following appointments have been made. **Mr. F. McL. Bruck** becomes divisional sales manager, N.E. Division, Bradford; **Mr. J. Sheppard** becomes divisional sales manager, N.W. Division, Manchester; **Mr. J. E. Gutteridge** becomes divisional sales manager, S.W. Division, Wolverhampton; **Mr. J. Cooper** is divisional sales manager, S.E. Division, Nottingham; **Mr. W. B. Middleton** is divisonal sales manager, Irish Division, comprising N. Ireland and Eire, and finally, **Mr. L. R. Hall** becomes commercial manager, London Sales Divisions, with **Mr. A. Knowlden** as divisional sales manager, London (South) Division, Thornton Heath, Surrey.

A memorial service for **Sir Johnstone Wright,** held last week in the Queen's Chapel of the Savoy, was attended by a distinguished gathering of engineers and electrical personalities. Among those present were Sir Arthur Fleming, Sir Harry Railing, Sir John Kennedy, Sir Noel Ashbridge, Sir John Hacking, Col. B. H. Leeson, Mr. W. K. Brasher, Mr. P. V. Hunter, Mr. F. Waine, Mr. T. H. Martin Harvey, and Mr. W. C. Handley, Mr. V. Alexander Pask, Mr. E. R. Wilkinson, Mr. J. D. Peattie, Mr. J. T. Moore, Mr. Charles Cock, Mr. E. C. Holroyde, Mr. Maxwell Buist, Mr. C. Spooner, Mr. E. J. Ward, Mr. W. F. Slater, Cdr. W. T. Bird, Mr. R. W. Mountain, Mr. J. M. Donaldson, Mr. Douglas Kerr, and Mr. Harold Hobson. Prebendary E. H. Williams-Ashman officiated and Sir John Hacking gave an address. Lady Wright and other members of the family were unable to attend.

OBITUARY

We learn of the death of **Mr. R. Prince,** southern area district manager of W. T. Glover and Co., Ltd., which concern he joined in 1946.

Mr. W. O. Fenwick, D.F.H., M.I.E.E., technical editor of *The Electrical Review*, died on August 26. He joined that journal in 1918, and had been technical editor since 1948. He received technical education at Faraday House, and after a brief period in the drawing office of Fielding and Platt Ltd., joined the Bristol Electricity Department in 1914 as assistant mains engineer, later becoming assistant power station engineer. We offer our condolences to his widow, who is well known to many in the electrical industry.

Mr. W. O. Fenwick

The body was found last week in the Morice River, British Columbia, of **Mr. Fred T. Whiting,** vice-president of the Westinghouse Electric Corporation. Mr .Whiting disappeared while trout-fishing on a vacation trip. The cause of death was a heart-attack.

Mrs. F. T. Alldread, a director of George E. Taylor and Co. (London) Ltd., died on August 30, after a long illness.

Mr. Sidney Kupfer, founder of W. and E. Kupfer, electrical accessory dealers, died on August 26, aged 80, while on holiday in Switzerland.

Departmental Store Lighting

A new design installed in Sheffield Store

A NOVEL departure in the method of departmental store lighting has been carried out by John Walsh, Ltd., High Street, Sheffield, in their new store which has been erected on the site of the old one blitzed during the last war. The scheme was designed by the architects, Messrs. J. W. Beaumont & Sons, in conjunction with the electrical contractors, Messrs. F. H. Wheeler (Sheffield) Ltd., and under the supervision of the consulting engineers, Messrs. J. Stinton Jones and Partners, of London.

The special fluorescent lighting fittings described below were also designed by the architects and contractors, and manufactured by Smart and Brown (Engineers) Ltd., at their Spennymoor factory.

The general ceiling lighting, consists of a "honeycomb" ceiling into any space of which a lighting fitting can be fixed. This "honeycomb" ceiling is made up of 3in. x 2½ in. timber ribs at approximately 5 ft 0 in. x 2 ft 10 in. centres, which form a series of rectangular spaces and, except where a light fitting is fixed, these spaces can be used for access to all services which are immediately on the underside of the structural concrete floor, the whole of which is painted black.

The special lighting units consist of three main parts—the frame which fits into the rectangle, the louvre which is attached to the underside of the frame, and the fitting itself which consists of a deep inverted pan-shaped reflector in which are mounted four 40-watt fluorescent lamps (colour white 3500°K) and two 75-watt architectural lamps.

The fluorescent lamps, which are four feet long, are roughly equally spaced inside the reflector and parallel to the long side and the two architectural lamps are placed between the two outer fluorescent lamps at about the same level from the face of the reflector, all lamps are connected at the same time and resulting blended light has a very pleasing effect.

Special fluorescent lighting is employed for illuminating the portable case top counters, operating from 40-watt ballast units and using a similar 4 ft white lamp as used in the ceiling fittings, these cases are again connected to sockets under the structural floor.

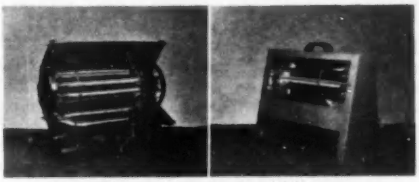
Some 400 special fittings are used necessitating 2000, 40w "Surestart" ballast units—the latest production of Smart & Brown. The ballasts provide instant start with any tube, no earthing of unit or tube is said to be needed.

The new lighting is seen to advantage in this view. Note that the lower edges of the louvre veins (inset) are pierced with a small star shaped design spaced at short intervals, which has the effect of introducing a certain amount of sparkle to the otherwise flat look of the louvres

The BUYER'S *Column*

Reeves are ready for winter

PARTICULARS of a range of electric fires to be ready for the coming heating season have been released by REEVES ELECTRICAL AND RADIO CO., LTD., Reelek Works, Baldock, Herts. Type R Minor is a popular-type sturdy 1 kW reflector fire fitted with a chromium reflector and safety guard and supplied in pastel shades. Price 35s. plus 19s. 3d. tax. Type R1 (1 kW) and Type R2 (2 kW) reflector fires are constructed from heavy gauge steel and finished in a range of colours. They are equipped with chromium plated



Two of Reeves' attractive 1953 range

reflectors and safety guards. Prices, for R1, 28s. 6d. plus 15s. 8d. tax; R2, 45s. 10d. plus 25s. 2d. tax.

The adjustable model fires are supplied in one and two kilowatt sizes and are well constructed with end castings of cast aluminium and feet of heavy gauge steel with provision for wall fixing. These fires are supplied in bronze enamel finish. The 2 kW model is fitted with a selective switch at the rear. Prices (1 kW), 45s. 10d. plus 25s. 2d.; 2 kW, 54s. 2d. plus 29s. 8d. tax.

"Crompton" Batteries

BEGINNING in September 1953, traction, commercial and car starter batteries manufactured by CROMPTON PARKINSON, LTD., Crompton House, Aldwych, W.C.2, will be marketed under the brand name "Crompton," thus superseding the name "Young" which has been used for over 25 years since the Young Accumulator Co., Ltd., began manufacturing in 1927.

Crompton's say that from the time the Young Accumulator Co., Ltd., became part of the C.P. group in 1941, there has been continuous development in battery design and construction.

As the latest result of this research, simultaneously with the change of name, the new "Crompton" car starter battery is being introduced. Since battery performance and life largely depends upon plate design and reliability, research in the past few years has been undertaken to produce a battery plate which gives greater power and has a longer life.

A new design of grid made from "Nilcrode" alloy retains active material more securely, stays rigid and resists corrosion. A new formulation of active material gives greatly increased power.

In order to realise the longer life obtainable from the new plate, Crompton car batteries now incorporate "Dri-Stor" micro-porous separators which are virtually indestructible and completely unaffected by immersion in acid.

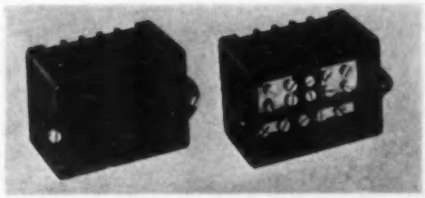
Booster pumps

IN most large scale low pressure hot water central heating systems accelerator pumps become necessary to provide adequate circulation. A series of Fullway pumps for this purpose are manufactured by RYLAND (MANCHESTER) LTD., High Street, Deansgate, Manchester which are fitted with Hoover electric motors, in $\frac{1}{4}$, $\frac{1}{3}$ or $\frac{1}{2}$ h.p. sizes according to the duty.

Instead of the ordinary stuffing box, these pump units are fitted with special sealing arrangements which are trouble-free and require no attention. Furthermore this arrangement provides a protection for the motor since the latter cannot be overloaded due to the friction from the ordinary type of stuffing box packing.

"Henley" Insulated Connector Box

ANOTHER new accessory recently introduced by W. T. HENLEY'S WIRELESS TELEGRAPH WORKS CO., LTD., 51 Hatton Garden, E.C.1, is a neat and compact multi-way double-pole insulated connector box designed for use in all situations where it is necessary to connect a number of sub circuits to a main circuit. Each connector is suitable for three conductors up to 0·0225 sq in. and two up to 0·04 sq in.



Henley's new insulated connector box

The need for a connecting box of this kind frequently arises in domestic and commercial installations at metering positions, as well as at other situations and also on the smaller circuits of industrial installations.

The complete box consists of two units which fit neatly together, and a common reversible cover protects the live metalwork of both units. This arrangement allows the two connectors to be separately housed and, at the same time, phase and neutral cables for each circuit connected into the box can be arranged adjacent to each other, thus making provision for neat and readily identifiable wiring. The overall dimensions of the box are: length $2\frac{1}{8}$ in., width $3\frac{1}{16}$ in., depth $2\frac{5}{32}$ in.

Paladin Mixer/Pulverisers

TWO of the three high speed mixer models marketed in this country by L. P. PATENTS, LTD., Paladin House, Bassett Avenue, Southampton, incorporate "boost drive" giving an ultra rapid speed surge.

The Paladin Junior has a four position switching to give speeds of 7,500 r.p.m. and 16,000 r.p.m. to the six profiled blades forming the rotary pulveriser. These are mounted in a heat-resisting glass goblet which fits into the motor unit base finished in red, black and cream. Price of the Junior (380W) is £17 13s. 11d.

The "Senior" model has a 450 W motor giving four speeds to the rotor—5,500 r.p.m., 7,500 r.p.m., 11,000 r.p.m. and with boost drive by press button switch, 17,000 r.p.m. An additional point of this model apart from its chromium finish is the hermetic four lobed double lid which allows foodstuffs to be added during mixing without splashing—a chrome finished cup which snugly fits into this orifice is perforated to permit the addition of small exact measures of ingredients in blending as desired. The Senior costs £20 19s.

The "Twin" which is illustrated, incorporates the Senior mixer together with a three-litre "Phoenix" glass mixing bowl in which is fitted a special whisk for whipping and mixing or a dough hook for heavy work. An important feature of this unit which is powered either alternatively or simultaneously by the pulveriser motor (450 W) is that the rotor in the mixing bowl is driven from the top of a central shaft thus obviating any possible leakage. A specially designed l'd again allows the progressive addition of ingredients. This unit is finished in cream enamel and is pr'ced £32 15s. 3d.

The Paladin twin unit incorporates the "Senior" mixer

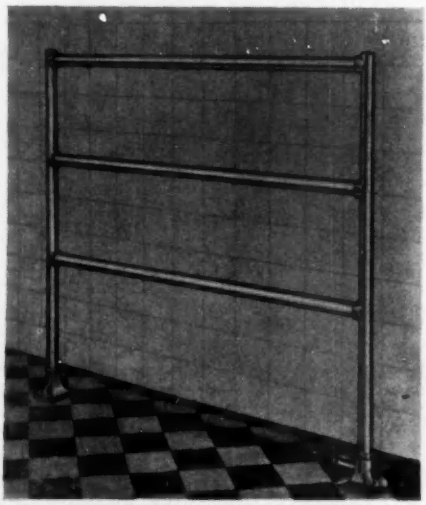
New Hurseal Oil-filled Towel Rail

THE Hurseal-Leda electric towel rail just introduced by HURSEAL LTD., 229 Regent Street, W.1, employs the patented Hurseal oil circulation system. The electric element warms a hermetically sealed oil which diffuses a low temperature of 140° Fahrenheit over the heating surface of all the rails. There is no danger of scorching or burning as is sometimes possible with the dry element type of airer.

The rails are available in the following types and sizes.

3-Rail Floor Models:—

	Height	Length	Rating	Price Inc. Tax
L.F.30	36 in.	30 in.	120 W	£34 16 7
L.F.36	36 in.	36 in.	130 W	£36 8 4
3-Rail Wall Fitting Models:—				
L.W.30	21 in.	30 in.	120 W	£31 13 2
L.W.36	21 in.	36 in.	130 W	£33 4 11



Hurseal's new towel rail is oil-filled

TRADE PUBLICATIONS

LADDERS.—Four-wheel general purpose trolleys, sack trucks, and single wood ladders are the subjects of three leaflets issued by Bardsleys-Colchester Ltd., 196 Bergholt Road, Colchester.

HOROLOGICAL MECHANISMS IN INDUSTRY.—The paper of this title delivered by Mr. E. Tauchert to the British Horological Institute earlier this year, has been reprinted as a booklet by Venner, Ltd., Kingston By-Pass, New Malden, Surrey.

PHOTO-ELECTRIC CELLS.—A new leaflet has been published by Radiovisor Parent, Ltd., Stanhope Street, London N.W.1, describing their new Mark XV automatic lighting control unit.

HEATING, VENTILATING, ETC.—A survey of the company's manufacturing capacity and the range of products made is contained in Publication 2302 entitled Sturtevant Products and issued by Sturtevant Engineering Co., Ltd., Southern House, Cannon Street, E.C.4.

BOILER CONTROL.—New catalogue H.41 surveys the pressure reduction and desuperheating equipment which is supplied by James Gordon and Co., Ltd., Dalston Gardens, Stanmore, Middlesex.

The WEEK in NEWS

T.U.C. Views on Nationalisation

General Council Prepares Report for Congress

ELECTRICAL engineering is mentioned as an industry requiring rapid development in an interim report on public ownership which the General Council of the T.U.C. has prepared for discussion at the coming T.U.C. Congress. Need for rapid development is considered a criterion for inclusion in future nationalisation programmes. The report notes that electrical engineering is not a clearly defined industry, but has several inter-connected sections, each with its own problems. Final judgement is deferred until action on Monopolies Commission reports is apparent, but it is noted that particular importance will be attached to the report on heavy electrical equipment.

Besides considering the future, the report also reviews the past, in terms of the performance of other nationalised industries. The general conclusion regarding the B.E.A. and the other fuel and power industries is that nationalisation has improved the efficiency of operations and aided development. It is admitted that there may have been some instances where managers of more efficient units have found themselves hampered by the need to fit into the administrative machine, but these cases are regarded as exceptions to the general rule of improvement.

Dry Batteries in India

AS from the beginning of next year, India's dry battery industry will not be protected from foreign competition. Hitherto a duty of 30% *ad valorem* with a 5% surcharge has been imposed on imported batteries, but it is now considered that the industry is no longer threatened by foreign competition. Capacity of the industry has been estimated at 214·5 million cells a year. Actual production during 1952 was 130·11 million cells of which 1·1 million were exported.

Radio and TV Sales' Season Decline

IT was hardly likely that the large increase in the sales of television sets in May, just before the Coronation, would be maintained during the following month, which is traditionally a poor month anyway. Thus, the latest R.T.R.A. index for June shows a considerable decline, but nevertheless sales were well over double those of the corresponding month last year. Actual figures were 7.72 sets per shop during June, as compared with 18·74 in May and 3·15 in June, 1952. Sales of radio sets followed a similar trend; figures in that case being 5·86 last June, a fall of 1·21 over May and comparing with 4·58 in June, 1952.

Electrician's Strike Starts Again

AFTER a break of a few days during which representatives of the E.T.U. and the N.F.E.A. got together at the request of Ministry of Labour conciliation officials, the strike of some 1,500 electricians began afresh on Tuesday morning. Thus, the situation at the time of going to Press is exactly the same as last week. Workers on ten key sites in various parts of the country have again stopped work, as also have electricians employed on exhibition work at Olympia and Earls Court. The Union's threat of bringing more workers out has been renewed and "suitable" sites are being considered.

In the middle of last week the Union and Employers' Association met to discuss the matter at the request of the Ministry. The meetings appeared to be going satisfactorily, and by the weekend it was understood that a solution might be found. A further meeting was called for Monday, but deadlock resulted and the strikes broke out again. It is understood that the N.F.E.A. sought to give further consideration to the case and wished to consult their 93 branches. This, however, was described by the Union as "delaying tactics."

The First Half Century

Some months ago I had occasion to express my regret that of certain photographs taken in Italy during the I.E.E. visit, one of Carlo Longatti, an old man of eighty-eight, who had, as a boy, been a pupil of Volta, had proved a failure. There were, however, many cameras at Cainnago. I have accordingly been able to secure three photographs of the old boy, whose acquaintance we made at Volta's tomb. Another correspondent sends me a portrait of Mr. Brown of Brown Boveri's, also an excellent portrait of Mr. Otto Blathy. Many of the best snapshots taken during the Italian visit can be seen at the offices of the I.E.E., where there is an exhibition on the lines of that following the Swiss trip.—*From our issue of September 3, 1903.*

Belfast Contract—Action in High Court

JUDGMENT has been reserved in the High Court in Belfast on an application for an order to prevent the Corporation completing a contract with Babcock and Wilcox, Ltd. and to compel the Corporation to advertise publicly. The contract involves the supply of seven boilers for the new West power station. The application was heard by Mr. Justice Curran who promised to give his decision soon.

The application was made by Ald. McKee, who maintained that quotations had been invited from only five firms. Mr. C. Nicholson, Q.C., for the applicants, said the Corporation was legally bound to advertise publicly for tenders. As a result of the Corporation's failure in their statutory duty, he submitted that about £250,000 had been lost to the ratepayers and electricity consumers. Mr. Justice Curran doubted the statutory obligation to invite public tenders. He said if standing orders allowed a committee to select reputable firms and ask them to tender, that would comply with the statute. Mr. Nicholson disagreed, maintaining that the word tender in the statute meant public tenders.

He read an affidavit from Ald. McKee who said no tender had been invited from outside the Boilermakers' Association. His Lordship pointed out that reference had been made to a price ring which was hardly complimentary. Mr. Nicholson said the method adopted limited competition to five firms which had resulted in a considerable loss of money, but there was no suggestion that there was anything but an error of judgment on the Corporation's part.

Acting for the Corporation, Mr. E. Warnock, Q.C., submitted that Ald. McKee was not entitled to apply for an order. Furthermore there was no default in compliance with standing orders. There was no evidence of a private arrangement among the firms involved.

Ultrasonics Detect Rail Flaws

READERS concerned with ultrasonic testing, may be interested to know that the equipment used by the London Transport Executive to detect running rail flaws, as described under the above heading on page 22 of our issue of July 2, was supplied to the L.T.E. by The Equipment and Engineering Co., permission now having been obtained to make this information available.

OFFICIAL PUBLICATIONS

CENSUS OF PRODUCTION, 1950: Vol. I. Retail and Service Trades—Area Tables. H.M.S.O., 7s. 6d.

TECHNICAL EDUCATION. 12th Report of Select Committee on Estimates. (*see page* 445) H.M.S.O., 7s. 6d.

OVERSEAS ECONOMIC SURVEY. Denmark. H.M.S.O. 3s. 6d.

Film Festival and Congress

A LIST of some 60 films has been compiled by the Scientific Film Association and is being sent to Brussels for final selection for the coming Belgian Festival of Industrial Films. The Belgian Govt. invited the Association to submit entries some time ago. They will be classified under five headings, prior to their being shown. These classes will concern research, vocational training, human relations and productivity, and sales and prestige films.

While on the subject of films, we note that the seventh annual congress of I.S.F.A. will begin in London on Sept. 22. Speakers from several European countries will give examples of industrial uses of films. The Association is at 165 Shaftesbury Ave., W.C.2, and will be pleased to receive enquiries.

ACCENTUATING RUINS at PORTSMOUTH

Following our photograph a fortnight ago of the floodlit ruins of Ludlow Castle we reproduce the more recently ruined edifice of Portsmouth Guildhall, floodlit by the Southern Electricity Board. The lighting was arranged to accentuate the ruined conditions. Visible inside walls were illuminated by 140 W sodium units which contrasted well with the tungsten-lit exterior. Main illumination outside came from twenty-six 1,000 W projectors, and special features were picked out by fourteen 1,000 W narrow-beam long-range projectors. Six of the latter were also positioned at the base of each of the columns at the main entrance

Roundhay Road, Leeds, where a recently introduced street lighting lantern has been used. This road forms part of a scheme covering about 10 miles of the city's main roads

BUILDING SHORTAGE SLOWS TRAINING

CONCERN at the restrictions imposed on technical education by the shortage of teaching space and the delay in completing new buildings, is expressed in the Twelfth Report of the House of Commons Select Committee on Estimates published last week. The committee consider that the greatest credit reflects on everyone who is in any way concerned with technical education, both for the enterprise which is being shown in improvisation and the determination to overcome all obstacles. None the less, they feel that the national effort is bound to be retarded by continued inability to provide satisfactory accommodation.

There is a further recommendation in the report that Regional Advisory Councils should be asked to find out in which industries deficiencies in technical college courses and places exist, and also the extent of such shortages.

1953-54 Lectures at Sir John Cass College

TWO courses beginning next month at the Sir John Cass College in London will be of particular interest to electrical engineers. The first consists of a series of five lectures on Ferro-electricity by Mr. L. A. Thomas which begins on October 2 and continues on succeeding Friday evenings. The other deals with Electronics and is a course of lectures on mathematical theory and its applications by Mr. T. H. Walton. It begins on October 8 and will last throughout this 1953-54 session. Enrolments for full-time courses will be on September 23 and 24 and for part-time courses on specified dates between September 21 and 24.

ADVANCED TECHNOLOGY COURSES

IN a circular issued this week, the Ministry of Education calls the attention of local education authorities and others concerned, to the urgent need to expand the provision of advanced short courses, which enable scientists and technologists in industry to keep abreast of developments.

To promote development Regional Advisory Councils and Academic Boards are being asked to make a special survey of the needs for these courses for different industries. Industrial firms and employing organisations are invited to make suggestions for courses to the Ministry of Education (F.E.I.), Curzon Street, London, W.1, or to the secretary of the appropriate Regional Advisory Cncl.

New Lantern Used in Leeds Scheme

A RECENTLY introduced street lighting lantern has made its debut in a major installation carried out at Leeds. The fitting concerned is Crompton Parkinson's Corona II sodium lantern (SG305EX) which, although following the same pattern as its immediate predecessor, also accommodates the control gear. The advantages of this are obvious, and where, as in the Leeds system, they are mounted on tramway standards as well as normal concrete columns, the avoidance of cumbersome control gear boxes is of immense help.

The whole installation carried out at Leeds covers about 10 miles of main roads. The Roundhay Rd. section, illustrated here, involves a total of 61 Corona II lanterns, with 140 W sodium lamps. Forty-seven of these are mounted on concrete columns and the remainder on tramway standards. The installation designed by the city's street lighting engineer, Mr. L. A. Doxey, replaced tungsten filament lamps and gas lanterns. Incidentally, the new scheme is expected to effect a saving of about £230 per annum.

Crompton Parkinson Ltd. are to feature this new type of lantern at the forthcoming A.P.L.E. exhibition in Liverpool.

Liability to P.T.

AS regards purchase tax on sale or return, on approval and similar transactions, the Commissioners of Customs and Excise have issued a statement on the effect of certain forms of contracts in deferring the time at which liability to the tax is incurred. It is stated that no such contract can have the effect of deferring liability to tax beyond the date of delivery of goods to the retailer unless the latter has an absolute right to return the goods at any time up to an agreed time limit. Traders are advised to consult their local Officer of Customs and Excise.

MONEY BOXES FOR Y.E.B. CONSUMERS

EASY payment schemes have occupied the time of Electricity Board officials for some months and various systems have been devised which will help consumers to pay for their electricity as they use it instead of having to find one large sum at the end of each quarter. A system of savings stamps gained popularity less than a year ago, and after proving most successful in the North-Western area was being seriously considered in Yorkshire. That Board has, however, finally decided to issue small "weekly savings boxes." The idea has been functioning in Leeds for some years, but will now be extended.

The money-box system is quite simply that the Board issues a pocket-sized box in which the consumer deposits a weekly sum. At the end of a quarter he takes the box to his service centre where it is opened and the contents used to pay the bill. The balance is returned to or made up by the consumer.

Chairman of the Board, Mr. D. Bellamy, said last week that 251,000 consumers already had easy payment facilities. During the past year, 12,800 had applied for replacement of their prepayment meters by ordinary meters, whereas 7,000 wanted prepayment meters. He said the prepayment meter was much more expensive and the money-box appeared to be the simple answer.

Refresher Course in Fuel Efficiency

AN opportunity to get up to date in fuel efficiency technique is presented by a refresher course to be run by the Ministry of Fuel and Power at Brasenose College, Oxford, between Sept. 21 and 25. It is a refresher course for works and plant engineers responsible for fuel utilisation. Lectures by experts will be supplemented by discussions. The syllabus includes such subjects as Economics of Fuel Selection; Combustion Control; Steam Generation—usage and peak loads; Steam Economy in Works Practice; Determination and Interpretation of Heat Balances; Design and Operation of Power Plant; Control of Power Factor and Maximum Demand; and Waste Heat Recovery. Fee for the course is £2 10s., and accommodation is available. Enquiries should be addressed to the Fuel Education Joint Advisory Committee at the Ministry's Southern Region Offices, Whiteknights, Earley, Reading.

E.I.B.A. form New Branch in N. London

ALL members of the E.I.B.A. in the North London area are invited to attend the inaugural meeting of a new branch which is to be held on September 14 at 2.30 p.m. Meeting place will be the offices of the Eastern Electricity Board, Station Rd., Wood Green. Although we have mentioned N. London as the district concerned, we note that the area covers Herts. and W. Middlesex, including Wembley, Enfield, Hendon and Harrow, and extends as far as Hoddesdon, St. Albans and Letchworth.

Busy Days for Purchasing Officers

BRIGHTON has been chosen for the 1953 National Conference of the Purchasing Officers Association which will take place between September 24 and 27. The conference programme was issued last week and as usual includes numerous papers, discussions and social events which ensure a busy four days for attending delegates. Mr. L. W. Joynson-Hicks, Parl.-Secretary to the Ministry of Fuel and Power is to open proceedings, and subsequent papers will cover such subjects as Coal in the National Economy, Packaging, Materials Handling, and the Schuman Plan. Seven discussion groups will meet on the Friday afternoon. Social events include the civic reception and dance, a dinner-dance, concert, golf, bowls and tennis tournaments.

By no means least among attractions will be the fourth Minibition which has steadily gained in popularity. As last year this will be situated in the Conference Hall. Further information concerning accommodation, terms and registration may be obtained from the Assoc. at Wardrobe Court, 146a Queen Victoria St., E.C.4.

Above is a section of Mortlake Rd., Richmond, Surrey, where Revo (C13596) "Silverblue" lanterns on concrete columns were installed some weeks ago. A total of 21 units were used in this part of a scheme which also included Richmond's Hill St. In that case, however (C13740) wall mounted fittings were employed, a total of 34 units being employed. Reproduction is by courtesy of Mr. G. S. Weddle, borough engineer

Courses for N.C.B. Electricians

THE improvement of efficiency in the mines has been the subject of particular consideration by the National Coal Board in recent months, and in an effort to bring this about a number of courses have been held for the benefit of key employees. A new phase in the Board's campaign is beginning, and we note that special attention is being paid to colliery electricians. This class of employee is now endeavouring to cope with an ever increasing amount of mechanisation, and a programme of courses is to begin this month to bring them up-to-date with existing apparatus and practice in the mines.

Highly skilled men have already attended a preliminary course and these are now organising five-day courses in coalfields. There are about 10,000 electricians employed in the mines and it was found almost impossible to bring them together for single central instruction.

Evening Courses

THE electrical engineering dept. of the Polytechnic, Regent St., London, has issued its prospectus of evening courses for the coming session. The courses prepare students for the national certificate in electrical engineering, for the degree, the A.M.I.E.E. examinations and for the City and Guilds of London Inst. examinations. Apart from electrical engineering the prospectus includes telecommunications and radio and television servicing. Enrolments will take place on September 23 and the first term starts on September 28.

E.I.B.A. DANCE

HARD on the heels of the Birmingham branch's announcement last week of their annual ball, came the date of the E.I.B.A. Hants and Dorset branch's similar function. This, the fourth annual ball, will be held on February 5. Venue will be the South Parade Pier Pavilion, Southsea.

SILVER JUBILEE OF BUILDING SHOW

THIS year's Building Exhibition, which opens at Olympia on November 18, will be the largest in the exhibition's history, judging from early reports received last week. There will be nearly 600 stands depicting every branch of the trade. This achievement is particularly appropriate, as the exhibition this year celebrates its silver jubilee. Although prefabrication and prestressed concrete form the main features of the display, we are pleased to note that electrical interests are well represented. An early list of exhibitors gives such names as Aidas Electric, British National Electrics, Brush, E. K. Cole, Edison Swan, Kango Hammers, Philips, Remington Rand, Stewarts and Lloyds, and Wolf Electric Tools, besides many others directly or indirectly connected with the electrical industry. The advance of mechanisation will be well indicated. The exhibition closes on December 10.

Large Installation in Belfast Mill

POST-WAR reconstruction of large factories and office blocks have provided electrical contractors and their associates with many sizeable contracts. One which must have been welcomed concerned the York St., Belfast, mill of the Flax Spinning Co., Ltd. This is one of the largest factories of its kind in the British Isles, and probably, in the world. The electrical work involved may well be creating records as far as quantities of materials used are concerned. It has been estimated that some 36,000 ft. of conduit, 10,000 ft. of trunking and several thousands of yards of cable will be required to serve about 1,500 lighting points, besides numerous other items of equipment and material. Main contractor for the supply of fittings and accessories and the lighting installation, was Siemens Electric Lamps and Supplies Ltd. Sub-contractors were James Crawford Ltd.

NEWS IN BRIEF

Ripon and Pateley council are campaigning against high capital charges for supplying electricity to farms. Instances have been given where farmers have been asked to contribute up to £650.

Portland Players, of the B.E.A.'s Sports and Social Club, are to present "Across N. Africa with a Pelican" at the Cripplegate Theatre, Golden Lane, E.C.1, on September 15 and 16.

One 5,000 kW turbo-alternator set is to be supplied by Fraser and Chalmers Engineering Works of the G.E.C. to Guest Keen Baldwins Iron and Steel Co. It forms part of an extension to the company's power station at their Cardiff factory. The same firm has also received contract for two electric winder equipments for the N.C.B.'s Lea Hall Colliery.

Annual dinner of the E.C.A. has been fixed for January 27 next. It will take place at Grosvenor House, London.

Over 100 flashing beacons will be installed on Bradford pedestrian crossings if a recommendation before the city council is approved.

Mr. Stjepan Huil, sales executive of Yugoslavia's Importing Organisation, Merkur, spent some time at the works of Oldham and Son Ltd., during his recent visit to England.

Swiss broadcasting authorities have ordered a complete television outside broadcasting vehicle from Marconi's Wireless Telegraph Co. Ltd., for delivery within nine months.

The new extension to Aerialite Ltd.'s factory in Cheshire has just been completed. It covers an area of 20,000 sq. ft. and became necessary following the increased demand for television and radio aerials.

Coventry football club have reversed their previous de.ision and have now decided to install floodlights, we hear.

Electric Supply News . . .

Ayrshire

A scheme for the reinforcement of the supply system at 33kV in that part of Ayrshire north of Kilmarnock is in hand by the South West Scotland Electricity Board.

This is necessary as part of the Board's programme for the rural development of the area and as a result of the steady increase in demand. The scheme includes the erection of a 33 kV overhead line between Kilmarnock and Kilbirnie, a distance of 13 miles in which only one wayleave was refused by a farmer for a distance of 1,091 yds. After application for consent to the Ministry of Fuel and Power who intimated his consent, the route will be in operation by December this year despite the four months' delay occasioned by the objector.

Durham

Contrary to popular belief, the North Eastern Electricity Board intend to convert the supply of electricity from d.c. to a.c. only in the Blackhall area. Other nearby villages of High Hesleden, Monk Hesleden and Hesleden would probably get a.c. supplies within 18 months.

Eire

Plans for the hydro-electric development of the Clady River near Gweedore, Co. Donegal, by the Electricity Supply Board have now been approved. Three lakes will be involved in the project—Lough Nacung (upper and lower) and Lough Dunlewy. A control dam will be constructed and water emerging from Lower Lough Nacung will be diverted into a head race canal. The power station having a capacity of 4,000 kW will be built on the bank of the Gweedore River. Total annual output of the scheme when completed, is estimated at 13½ million units. The Electricity Supply Board is continuing with its investigations of other potential hydro-electric sites. At the moment the authorities are awaiting the final report from engineers at work in the Annamone district on the Avonmore River.

Forest of Dean

Concern has been expressed locally at the impending closure of Lydney Power Station, especially by the local trades council who approached the T.U.C.

In a reply to the council read by the secretary of the Monmouthshire Federation it was stated that the station was approaching the end of its normal life with present equipment, although it will probably be kept in service during the present power shortages.

No definite decision had been made whether to close or re-equip the station, but in view of the supply of Forest of Dean coal, which the station used, rapidly nearing exhaustion, it was improbable that the station would be re-equipped. This would mean that coal would need to be transported from another coalfield and it would thus be more economic to site a new station nearer to the coalfield supplying it.

It was emphasised in the letter that the question had not been definitely settled and it was still possible for the station to take on a longer lease of life after re-equipment.

Sutton Coldfield

A twenty-three-year task, changing over supplies in the Sutton Coldfield area from d.c. to a.c. will be completed this week by the Midlands Electricity Board.

The changeover started in 1930, when Sutton began receiving supplies from Birmingham and at vesting day, 4,647 consumers remained on d.c. supplies in the M.E.B. Sutton district. Last consumer on d.c. supplies in the area was a laundry, which is now completely converted to receive a.c. supplies.

According to recent reports, there are still some 11,000 consumers receiving direct current supplies in Birmingham, but it is expected that these will join the other 374,000 consumers on a.c. in the Birmingham sub-area within another four years.

LIGHTING SCHEMES

Bolton.—Lighting Committee has received approval to the borrowing of £10,080 for improved street lighting on Withins Lane, Thicketford Road, Spa Road, part of Mayor Street, part of Park Road, Gelnow Road, Tudor Avenue, Crescent Road and Fletcher Street, from Derby Street to Bridgeman Street.

Gloucester.—R.D.C. has approved electric lighting scheme in Hucclecote, Barnwood, Longlevens, Longford and Brockworth.

Greenock.—A scheme to provide 94 lamps on 15 ft. concrete columns on the Larkfield housing estate has been approved by the town council.

Keynsham.—The council has been recommended to approve the erection of a further 26 lighting standards for sodium lanterns on the main Bath-Bristol trunk road at Saltford. This work will cost about £2,132 and should bring the road up to A.4. standard and into line for a grant.

Reading T.C.—Improvement to lighting in Bath Road from Liebwood Road to the Borough boundary have been approved by the Minister of Transport. The cost of providing and erecting forty-two 250 MV lamps and necessary supplies is estimated to be £3,800.

S. Westmorland R.D.C.—Council recommended to approve the installation of 59 new street lamps in various streets at a cost of £2,060.

Wanstead and Woodford.—T.C. is considering a scheme for improved lighting on certain district roads at an estimated cost of £7,000.

Warrington.—The R.D.C. is seeking the co-operation of the M.o.T. on a scheme for improved street lighting on Class "A" roads in the area at an estimated cost of nearly £47,000.

Company Activities . . .

Aberdare Cables (Holdings)

It is proposed to capitalise £493,715 to be appropriated to and applied in paying up in full 1,974,860 shares of 5s. each, to be alloted in the proportion of one new share for every share held.

Brook Motors Ltd.

Treasury consent has been obtained to a one-for-six scrip issue. This will capitalise £71,335 10s. from capital reserve, and the 142,671 Ordinary shares of 10s. each will be allotted to holders at September 18. Extraordinary general meeting will be held on September 29 and renounceable allotment letters will probably be posted on October 2. Final dividend is expected to be 15% (same) on the increased capital.

A. C. Cossor Ltd.

The Ordinary dividend is 10% (*same*). The directors propose to further increase the capital by another 2½ million Ordinary shares of 5s. each, which are to be issued as and when a favourable occasion may present itself, Lord Burghley, the chairman, states.

Electrical Components Ltd.

The decrease in the net profit, year ended March 31 last, was comparatively small, bearing in mind the more substantial drop in the gross profit, as will be seen from our accompanying table. Mr. L. S. Seccombe, the chairman, considers that the prospects for the current year are not discouraging. The taking over of the small subsidiary company in Scotland was completed during the year. For this concern, trading in the first year has been reasonably satisfactory and the company seems well situated for expansion, he adds. A combined reduction of £20,000 in the value of stocks at branches at March 31 is noted, in spite of the addition of figures of J. F. Irvine and Co., Ltd. for the first time.

Year to Mar.31	£ Trading Profit	£ Net Profit	% on Ord. Earn'd	% on Ord. Paid	Ord. Price High	Ord. Price Low
1949	127,821	50,013	53	14½	12/6½	9/6
1950	146,879	54,067	57	20	12/1	10/4
1951	175,867	53,711	50	20	12/6	10/6
1952	177,132	50,385	55	20	11/3	8/10
1953	141,851	44,903	45	20	10/1	9/3

Globe Telegraph and Trust

Net profit for the year 1952-53 was £230,645 (*£204,537*). After deducting the cost of the 3% interim dividend paid last February, £61,145, and the sum of £50,000 transferred to general reserve, there remains £119,500, which proves sufficient to meet a final dividend of 5% (*same*) making a total of 8% (*same*).

London Electrical and General Trust

For year to June 30, revenue was £94,030 (*£85,957*), including £3,667 (*£3,028*) in excess of one year's income, and after tax etc. it amounts to £38,728 as against *£34,845* in the preceding year. Ordinary dividend is 12½% (8%).

Palestine Electric Corpn.

Under preliminary agreement, Israeli Government has promised a 6% tax-free dividend, payable in sterling, to existing shareholders. It has not yet been determined what percentage of shares will be purchased by the Government. Report of the 50-50 partnership entered into by the Government and the Corporation is on page 436.

Rheostatic Co. Ltd.

It is proposed to raise £110,000 by issues of Preference and Ordinary shares to the respective classes of shareholders. The Ordinary issue is of 175,000 4s. shares at 8s. each in the proportion of five for every eight held. For Preference holders the issue is 80,000 6% 10s. Cumulative Preference shares at par on the basis of four for every eleven held.

Strand Electric Holdings Ltd.

The Ordinary dividend for the year to April 30 last, is again 17½%. Before charging taxation the consolidated profit is £39,228 (*£51,212*), while the consolidated net profit amounts to £20,938 (*£24,407*).

Thorn Electrical Industries Ltd.

A year of continued progress in which the company's industrial potential has been steadily expanded and the prestige of its brand names still further enhanced—that is how Mr. Jules Thorn, chairman, modestly prefaces the company's report for the year ended March 31 last. Closer investigation indicated by the figures in our accompanying table shows that over the past five years the company's expansion has been remarkable. The consolidated balance sheet as at March 31 last, shows a very healthy state of affairs. Current assets, for instance, amount to £4,254,560, which is over £200,000 lower than a year ago. But the reduction is due to sundry debtors having been reduced by over £600,000 to £1,623,510. Stocks and work in progress, at £2,277,862 is nearly £200,000 up, while the bank balance and cash in hand is over £210,000 higher at £352,688.

Year to Mar.31	£ Trading Profit	£ Net Profit*	% on Ord. Earn'd	% on Ord. Paid	Ord. Price High	Ord. Price Low
1949	187,184	51,959	40	20	20/6	14/9
1950	231,738	48,816	37	20	22/3	16/3
1951	517,323	155,218	51	10†	12/2	8/3
1952	681,169	210,885	66	12½	8/9	7/-
1953	771,292	205,264	70	12½	10/10	7/10

* Available for parent company.
† Plus 100% Capital bonus.

Dividends Declared

Cable and Wireless (*Holding*).—Interim of 3% (*same*).

Hubert Davies and Co.—Interim of 7½% (*same*).

R. B. Pullin and Co.—Interim of 5% on increased capital.

Sterling Cable Co.—Dividend of 15% (*12½%*).

Walsall Conduits.—Interim of 20% (*same*).

Commercial Information

CONTRACTS OPEN

HOME

Sept. 7.—Buxton T.C. Supply and installation of (i) three street lighting columns with MAF/V lamps, lanterns and auxiliary equipment to Group A; and (ii) 144 swan-neck conversion brackets, MBF/V lamps, lanterns and auxiliary equipment to Group B. Borough Engineer, Town Hall. Deposit £2 2s. (See Aug. 27 issue.)

Sept. 7.—Cannock U.D.C. Supply, erection and installation of 66 140 W sodium and seven 3 x 80 W fluorescent lighting columns on Cannock Road, Blackfords-Cannock Road, Hednesford, B.5013. E. Lomax, Engineer and Surveyor, Council House, Cannock, Staffs. Deposit £2 2s.

Sept. 7.—Durham. Electrical installation at Heighington Redworth Hall special school. Applications by above date to G. R. Clayton, county architect. Court Lane.

Sept. 7.—Long Eaton U.D.C. Supply only of 30 sodium and 21 fluorescent lamps and equipment; and supply and erection of 43 concrete and four steel columns and fixing of lighting equipment for Class A street lighting along Nottingham Rd. and Market Place. Engineer and Surveyor, Town Hall.

Sept. 7.—Manchester T.C. Rewiring for electrical installation at "Ashton House," Corporation St. City Architect, Town Hall. Deposit £1 1s. (See Aug. 20 issue.)

Sept. 7.—Preston T.C. Total rewiring of the lighting, heating and power circuits at the main Corporation Storeyard, Argyll Road. Total capacity of installation will be approximately 250 kW. Borough Engineer and Surveyor, Municipal Building, Preston. Deposit £2 2s. (See Aug. 6 issue.)

Sept. 8.—Bilston T.C. Supply and erection along two main roads of about 47 250 W h.p. mercury discharge lamps on 25 ft concrete columns, with some additional group B lighting in side streets. Borough Engineer, 20 Wellington Rd. Deposit £2 2s.

Sept. 8.—Louth T.C. Supply and erection of two electrically operated booster pumps and three electrically operated borehole pumps with auxiliary equipment. J. H. Haiste and Partners, 4 Queen Sq., Woodhouse Lane, Leeds 2. Deposit £2 2s.

Sept. 8.—Ormskirk U.D.C. Supply of 18 concrete columns, lanterns, lamps and auxiliary components for Group B sodium street lighting. Surveyor, Council offices, Burscough St. (See Aug. 27 issue.)

Sept. 8.—Whaley Bridge (Derby) U.D.C. Installation of system of sodium lighting along A6 road involving some 140 points. Surveyor, Council Offices.

Sept. 9.—Kidsgrove U.D.C. Supply of eleven 15 ft. concrete columns and 80 W mercury lamps, lanterns, etc., in Heathcote and Attwood Streets. Also 28 15 ft. concrete columns and 125 W mercury lamps, lanterns, etc., for Lower Ash estate. Engineer and Surveyor, Town Hall. Deposit £1 1s.

Sept. 9.—Newcastle-on-Tyne T.C. Repair and maintenance of lighting installations on various housing estates. City Architect, 18 Cloth Market.

Sept. 10.—Manchester. Alterations to electrical installation at Central Fire Station, London Rd. City Architect, Town Hall. Deposit £1 1s.

Sept. 10.—N. Ireland. Installation of electrical services in buildings at Downshire Hospital, Downpatrick. Hospital Authority's Chief Engineer, 104 University St., Belfast. Deposit £3 3s.

Sept. 10.—Stockton-on-Tees T.C. Conversion to mains supply of a 6-ton diesel-electric Stothert and Pitt Wharf Crane. Includes supply and fitting of 100 h.p. electric motor and starter. Manager, Corporation Quay. (See Aug. 27 issue.)

Sept. 11.—Crosby T.C. Installation of class A sodium lighting along Seaforth Rd. (A5036). Borough Engineer, Town Hall, Waterloo, Liverpool. Deposit £2 2s.

Sept. 11.—Slough T.C. Erection of 130 concrete columns with installation of 80 W mercury lighting on various sites during 1953-54. Borough Engineer, Town Hall. Deposit £2 2s.

Sept. 11.—Walthamstow B.C. Supply of 135-140 W sodium lamps on concrete columns along part of trunk road A.406 (N. Circular Rd.) Borough Architect, Engineer and Surveyor, Town Hall, E.17. Deposit £2 2s. (See Aug. 27 issue.)

Sept. 12.—Antrim. Conversion from d.c. to a.c. at Holywell Hospital. F. D. Brown and Sons, consulting engineers, 93 Ann St., Belfast. Deposit £5 5s.

Sept. 12.—Kingsclere (Hants) R.D.C. Internal wiring of 101 council houses. Surveyor, Council Offices, Kingsclere, nr. Newbury, Berks. Deposit £1 1s.

Sept. 14.—Epsom and Ewell T.C. Erection of 120 concrete lighting columns 25 ft. high with wiring, fixing of lanterns and auxiliary gear. N. Auty, Borough Engineer and Surveyor, Town Hall, Epsom. Deposit £2 2s. (See Aug. 27 issue.)

Sept. 14.—N. Ireland. Electrical installations in 477 dwellings at Newtownards, 46 at Larne, 36 at Armagh and 24 at Ballymena. Separate tenders for each. N.I. Housing Trust, 12 Hope St., Belfast. Deposit 10s. each scheme.

Sept. 14.—Swansea T.C. Applications to submit tenders for electrical installation in 82 houses on Portmead (Cadle) estate, should be made by above date to Borough Architect, The Guildhall. Deposit £2. (See Aug. 27 issue.)

Sept. 14.—West Riding. Contractors wishing to tender for lighting, heating and power installations should apply for their names to be included on lists of selected contractors for work valued at over £10,000. Applications to County Architect, Bishopgarth, Westfield Rd., Wakefield. (See Aug. 27 issue.)

Sept. 19.—Bridgnorth T.C. Supply and erection of 54 cast-iron class B lighting standards with 100 W tungsten lamps and other equipment for roads on the Grove estate. Borough Surveyor, College House. Deposit £2 2s.

Sept. 21.—Haverfordwest T.C. Supply and erection of 60 h.p. mercury vapour lamps, concrete and steel columns and wall brackets, along 1¼ miles of trunk roads A.40 and A.4076. Borough Surveyor, 9 Victoria Place. Deposit £2 2s. (Advertised in this issue.)

Sept. 23. — Newcastle-on-Tyne T.C. Supply and installation of four electric passenger lifts in multi-storey blocks of flats on Hindhaugh St. site. City Architect, 18 Cloth Market.

Sept. 23.—Swansea T.C. Applications invited from contractors wishing to tender for electrical installation at swimming baths, St. Helens Rd. Borough Architect, The Guildhall. Deposit £2. (Advertised in this issue.)

Sept. 28.—Stockton-on-Tees T.C. Electrical installation at Roseworth junior school. Borough Architect, 28 The Square. Deposit £1 1s.

Sept. 30.—East Riding. Installation of electrical services at Driffield secondary school. County Architect, County Hall, Beverley.

Oct. 5.—Manchester T.C. Electrical installation at Moss Nook secondary school, Wythenshawe. City Architect, Town Hall. Deposit £1 1s. (See Aug. 27 issue.)

Oct. 12.—Halstead R.D.C. Supply of two sets of electrically-driven vertical spindle borehole type pumps and two vertical electrically - driven booster pumps plus all ancillary equipment. Engineers, John Taylor and Sons, Artillery House, Artillery Row, Victoria St., Westminster. Deposit £5.

Oct. 17.—Tyrone. Electrical installation in new buildings on Goolnafranky estate, Cookstown, at a grammar school, secondary intermediate school and dining-room. Chief Education Officer, Education Offices, Omagh. Deposit £3 3s.

OVERSEAS

Details of items marked • may be obtained on application to the Board of Trade, Lacon House, Theobalds Road, W.C.1, quoting reference.

Sept. 24.—U.S.A. Supply of power and grounding equipment—transformers, spare parts etc.—for Davis Dam project, Arizona, for U.S. Bureau of Reclamation. B.o.T. (Ref.: ESB 2305/53)•.

Sept. 25.—Burma. Tenders (No. 1774/3 ES 125 Pt:A) invited for supply of transformers, switchgear and protective equipment for Electricity Supply Board, 153 Athlone-Strand Rd., Rangoon. B.o.T. (Ref.: ESB 2054/53)•.

Sept. 30.—India. Tenders invited (No. T.8/5-32) for supply of distribution transformer, boxes, h.t. and l.t. lightning arresters, air-break switches and fuses and a.c.s.r. conductors and accessories. Chief Engineer, Electric Grid Offices, Mercantile Bank Buildings, Fort, Bombay. B.o.T. (Ref.: ESB 2544/53)•.

Oct. 6.—New Zealand. Supply of 3 miles rubber insulated and lead (alloy B) sheathed leading-in cable, 1 pair/40, to G.P.O. Spec. CW.19E. Post and Telegraph Dept., Wellington. B.o.T. (Ref.: ESB 1731/53)•.

Oct. 7.—Australia. State Electricity Commission of Victoria invites tenders (Spec. No. 53-54/20) for supply of two 3-phase sets of oil immersed circuit reclosers for outdoor use in 22 kV 3-phase 50 c/s grounded neutral circuits, and one 3-phase gang-operated air break load interrupter fitted with enclosed arc control devices suitable for 6,600 V 50 c/s circuits. B.o.T. (Ref.: ESB 2402/53)•.

Oct. 14.—New Zealand. Post and Telegraph Dept. invites tenders (No. P. and T. 150/6413) for supply of 100,000 insulators, composition; to B.S.16. Director General (Stores Div.), G.P.O., Wellington. B.o.T. (Ref.: ESB 2185/53).•

Oct. 16.—Australia. Supply of 12 33 kV 3-phase outdoor type oil circuit-breakers, rupturing capacity 1,000 MVA with current transformers, etc. (Contract No. E14/53) for Brisbane City Council. Documents from Dept. of Electricity, Kelvin House, Adelaide St., Brisbane, at 10s. 6d each. B.o.T. (Ref.: ESB 2416/53)•.

Oct. 20.—New Zealand. State Hydro-Electric Dept. requires supply of five 110 kV, 2,500 MVA, 3-phase circuit-breakers and accessories for Otahuhu sub-station. Documents available at N.Z. Govt. Offices in London.

Oct. 21.—New Zealand. Stores Div. of Post Office requires supply of 200 miles of IRV and cotton braided cable for internal wiring. (P. and T. 150/6416.) Director-General (Stores Div.), G.P.O., Wellington.

Nov. 4.—Australia. State Electricity Commission of Queensland invites tenders (No. 402) for supply of 11 kV metal-clad compound-filled double busbar oil circuit-breaker switchboard. Scottish Union House, Eagle St., Brisbane. B.o.T. (Ref.: ESB. 1113/53).•

Dec. 1.—New Zealand. Supply of 466 steel transmission towers for Tuai-Gisborne 110 kV line required by State Hydro-Electric Dept., Wellington. Deposit required is £100 and bond £4,500. Copies of specifications available at N.Z. Govt. offices in London.

Your Queries — Answered

"Gladette" centrifugal fat extractor, makers of? A.S.—Gladette Fat Extracting Co., 23 Princess St., Barnsley, Yorks. (23748)

"Syracuse" hedge shears, agents for? W.H.—Lloyds and Co. (Letchworth), Ltd., Letchworth, Herts. (23756)

Bronchitis kettles, suppliers of? M.A.—Try C. H. Blackburn and Co., Ltd., 10 Gray's Inn Rd., W.C.1. (23769)

Fly killing device which uses the heat of an ordinary lamp, makers of? S.E.—We presume this refers to the lamp-like product supplied by:—Vulcan Fumigator Co., 306 Temple Chambers, Temple Ave., E.C.4. (23780)

"Jellac" electrolyte for safety lamps, makers of? C.W.—Ceag Ltd., Queens Rd., Barnsley. (23785)

"Micafil" insulating materials, agents for? T.E.—Impag (London), Ltd., 10 Lloyds Ave., E.C.3. (23799)

"Callboy" inter-com system, suppliers of? W.W.—Easco Electrical Service, 6/8 Brighton Terrace, S.W.9. (23804)

The above are selected from questions we have answered this week. If you have a query, send it to us.

ANSWER WANTED

"Prince" vacuum cleaners, makers of?—Y.B. (23807)

GAZETTE ANNOUNCEMENTS

COMPANIES ACTS

Acarat and Co., Ltd., Manchester. Frank Emery, 49 Church St., Eccles, Manchester, has been appointed liquidator by members.

E. J. Bowman (London) Ltd. Meeting of creditors will take place at 58 Paddington St., on Sept. 14 at 3 p.m.

Green Electrical and Engineering Co., Ltd. Creditors are asked to send particulars to liquidator, H. Campbell Bakes, 12 Dingle Rd., Gledholt, Huddersfield, by Sept. 26.

BANKRUPTCY ACTS

First Meeting

London. Harry E. Borradaile, lampshade maker, of 203 North End Rd., W.14. Date of receiving order, Aug. 17. First meeting at Bankruptcy Buildings, Carey St., W.C.2, tomorrow (Fri.) at 11.30 a.m., and public examination at same address on Oct. 29 at 11 a.m.

Dividends

Derby. Hector W. Sharp, electrical and radio engineer trading as Willdays at 178 Osmaston Rd., Derby. First and final dividend of 9s. 10½d. in £, payable at offices of trustee, Latham and Co., Walter House, 418-22 Strand, W.C.2, on Sept. 15.

TRADE NOTES

Argentine Exports. Exchange derived from exports of electric refrigerators, fans, with Argentine-manufactured motors, and fluorescent lamps can be negotiated on free market.

New Branch. L.E.S. Distributors Ltd. have opened a new branch at 54 Milton Rd., Southend-on-Sea. Tel. No. is Southend 46466. A new showroom has also been opened at 15-16 Alfred Place, W.C.1.

Representation. Ferranti Ltd.'s radio and television sales representative in Berks, Bucks, Hunts, Northants, Oxford and Wiltshire, will be Mr. J. B. Browning of 11 Stratford Rd., Hayes, Middx. In S. Eastern districts he will be Mr. J. R. Talbot of "Wyberlye," Leylands Rd., Burgess Hill, Sussex.

Telephone No. The telephone number of Morley's Electrical Services, Ltd., 117 Hornsey Road, N.7, has been changed to North 5008.

PRICE OF CABLE METALS AND OTHER MATERIALS
(at Tuesday night)

	£ s. d.	New York price
COPPER, electrolytic	228-229	—
(3 months)	215-216	—
LEAD, good soft pig (foreign)	95½-96	112 0 0
TIN (99-99·76%) (Cash)	622-625	—
(3 months)	612-615	—
ALUMINIUM, commercial purity (del.)	150 0 0	—
ZINC	72½-72¾	86-92
ARMOURING:		
Galv. Steel Wire (0·104 in.)	50 10 0	—
Mild Steel Tape (0·04 in.)	40 0 0	—

CONTRACTS PLACED

Bath T.C. Electrical installation at Royal Baths, Blackmore and Nation, £1,512.

Manchester T.C. Electrical installation in 366 houses on Langley estate, Middleton, F. L. Bampton Ltd.

Newcastle-on-Tyne T.C. Electrical installation in 614 dwellings on Longbenton estate, T. Mitchelson (Electrical) Ltd.

Northwich U.D.C. Electrical installation in 88 houses on Leftwich estate, Wm. Parks, £1,576.

Pewsey (Wilts) R.D.C. Installation of 797 lighting points in pre-war houses, and other work, R. O. Foote, £1,467.

Poplar B.C. Electrical installations and fittings and 12 shops and 21 dwellings in Roman Road, D.C. Engineering Co., £1,138.

Rowley Regis T.C. Electric lighting equipment for the Birmingham - Wolverhampton Road at Tividale, Revo Electric Co., Ltd., £7,220.

Scunthorpe T.C. Electrical work in 36 flats on New Brumby estate, H. Holl, £1,568.

St. Pancras B.C. Electrical work at Camden High St., Housing scheme. G. W. Franklin and Son Ltd., £6,997; also installation of flashing beacons at pedestrian crossings. Bergo Ltd., £1,973.

Southall B.C. Electrical work on Montague Rd. and Norwood Rd. estates, Reeds' Electrical (Southall) Ltd., £1,684.

Stoke Newington. Electrical work at Metropolitan Water Board's works, Rashleigh Phipps and Co. Ltd., £1,115.

Stoke-on-Trent T.C. Electrical installation in 76 houses on Blurton estate, £2,859, and 44 houses on Newstead Farm estate, £1,611, F. Hancock (1939) Ltd.

Sutton Coldfield T.C. Provision of street lighting in Chester Road, British Thomson-Houston Ltd., £3,095.

Thornaby-on-Tees T.C. Wiring of 299 houses, shops and flats, F. Dixon Barker, Ltd., £3,936; electrical work in 72 houses, W. S. Wilkes, £1,348.

West Bromwich T.C. Improvement of street lighting in class A along nine roads, £15,621; same in class B along nine roads, £5,034; and conversion from gas to electricity in other streets, £867; Midlands Electricity Board.

TRADE MARKS

This information is extracted from the Official Journal by permission of the Controller.

Amplidex. 717,371. Class 9. Error and voltage detectors and electric current exciters, etc. Brush Electrical Eng. Co. Ltd., Duke's Court, Duke St., S.W.1.

Conysil. 717,888. Class 17. Insulating materials and insulators. Connollys (Blackley) Ltd., Blackley Vale Mills, Blackley, Manchester 9.

Esel Lamps Last Longer in design B718,032. Class 11. Electric lamp bulbs. Stonehills Ltd., 92 Bradshawgate, Bolton.

"Sonomatic." 712,343. Class 9. Electrical apparatus for controlling by means of electric current control, the mechanical movements of apparatus and machines etc. Edgley Studios, Ltd., Lansdown Place Lane, Cheltenham.

Superweave. 719,557. Class 7. Portable electric generators. British Twin Disc and Clarifiers Ltd., Aldwych House, Aldwych, W.C.2.

Trixette. 717,969. Class 9. Sound recording and reproducing apparatus etc. Trix Electrical Co. Ltd., 1/5 Maple Place, Tottenham Court Road, W.1.

BUSINESS PROSPECTS

HOME

Aldrige (Staffs) U.D.C. Tenders to be invited for erection of about 125 houses on Wolverhampton Rd. site.

Alton (Hants) R.D.C. Construction of 50 dwellings in Station Approach. Engineer, Council Offices, Barton End, Alton.

Ashby-de-la-Zouch. Tenders will probably be invited in January for erection of factory at Windyridge for Meredith and Drew Ltd.

Ashton-in-Makerfield U.D.C. Approval given to layout plans for Bolton Rd. scheme providing for 218 houses. Further 40 houses to be built on Rectory Rd. site and 16 dwellings on Landgate Rd. site.

Atherton U.D.C. Construction of 104 dwellings in district. Architects are J. C. Prestwich and Sons, Bradshawgate Chambers, Leigh, Lancs.

Barnard Castle R.D.C. Application to be made to borrow £137,000 for erection of 46 houses at Evenwood, 32 at Gainford and 22 at Middleton-in-Teesdale.

Bath T.C. Construction of 78 dwellings under four contracts on Foxhill estate. City Architect, 7 North Parade Buildings.

Basford (Notts) R.D.C. Erection of 82 houses on three sites. Engineer, Surveyor and Housing Architect, J. J. G. Ellis, Rock House, Stockhill Lane.

Batley T.C. Erection of 40 houses on Fieldhead estate. Borough Engineer, West House, Hanover Street.

Basildon (Essex). A new secondary school is to be built at New Town. Estimated cost is £140,250.

Bebrington (Ches.) T.C. Approval received for erection of first stage of new £56,000 Town Hall.

Belfast. Min. of Commerce expected to invite tenders soon for erection of a Govt. factory on Carmoney industrial estate.

Birmingham T.C. Among building schemes approved recently are £192,566 Moseley modern school, £198,033 Bullesley Girl's grammar school, first instalment of £336,500 Teachers' Training College; and £274,229 Aldridge Rd. school. Bournville Village Trust seeking loan of £185,194 for erection of 103 dwellings on Shenley estate.

Brechin (Angus) T.C. Fifty-four houses to be built at Drumachlie for Scottish Special Housing Association.

Brighouse (Yorks) T.C. Approval received for erection of further 72 houses.

Brighton T.C. Construction of special school at Moulescombe. Borough Surveyor and Engineer, Town Hall.

Buttershaw (Yorks). Bulmer and Lumb Ltd., are planning to build £400,000 factory. Work expected to begin next spring.

Cardiganshire. Rebuilding of Ysbytty Ystwyth school. County Architect, County Offices, Marine Terrace, Aberystwyth.

Corby U.D.C. Some 150 dwellings to be built in district during 1954.

Dalton (Lancs) U.D.C. Application to be made to borrow £1,430 for electrical wiring in pre-war council houses.

Dublin. Erection of 258 houses in St. Anne's area. City Treasurer, Exchange Buildings, Lord Edward Street.

Dumbarton T.C. Dean of Guild Court has approved plans for 122 houses on Cardross Rd. sites.

Dumfries T.C. Erection of 68 houses on Summerville estate, and 34 houses and eight shops in Lincluden scheme has been approved by Dean of Guild Court.

Easington (Dur) R.D.C. Eighteen houses to be built at Murton, 16 at Wingate and 16 at Wheatley Hill.

Falkirk. Dunn and Wilson Ltd. are planning to extend their book-binding works.

Gateshead T.C. Erection of 178 houses on Wrekenston estate. G. F. Winters, Borough Surveyor, Municipal Buildings, Swinburne Street.

Glendale R.D.C. It is proposed to erect 70 houses on Westwood Ave. site.

Greenock T.C. Plans approved by Dean of Guild Court for erection of 105 houses in Larkfield area.

Hartlepool T.C. Plans in hand for erection of 42 flats at Northgate and Union St., and 30 houses in Vane Street.

Kerry (Eire). Tenders to be invited for erection of 84 cottages.

Keswick U.D.C. Plans approved for erection of 41 houses on Latrigg Close estate. Tenders to be invited soon.

Kirkburton U.D.C. All trades in erection of 36 houses in Lepton estate. Council's Architect, C. Hickson, of Stocks, Sykes and Hickson, 4 St. Peter's St., Huddersfield.

Leamington Spa T.C. Approval sought for next year's building programme, which includes 90 houses at Lillington, as well as 36 flats and about 225 other houses; 72 flats in Brunswick St., and 8 flats on Whitnash estate.

Middlesbrough T.C. It is planned to build 727 houses and flats in Pallister Park area.

Minehead (Som). C. and J. Clark Ltd., of Street, propose to erect new factory. Quantity surveyors are Venning and Hope, 16 The Crescent, Taunton.

Monmouth T.C. Tenders may soon be invited for installation of electricity in houses on Rochfield estate.

Newton Abbot U.D.C. Seventy-six houses to be erected during 1954.

Newton Aycliffe (Dur). Development Corpn. is considering erection of cinema.

Northants. Following projects are included in next year's building programme: £100,000 secondary school at Roade; £141,000 secondary school at Corby; and second instalment of secondary technical school at Wellingborough.

Poole T.C. Approval granted to erection of 440 houses on Alderney West estate.

Rutherglen (Lanark) T.C. Dean of Guild Court has approved plans for erection of 175 houses on Blairbeth scheme.

Salford T.C. Erection of police headquarters in the Crescent. Architects are Bradshaw, Gass and Hope, 19 Silverwell St., Bolton.

Scunthorpe T.C. Scheme approved for building shops and flats in Ashby High Street.

Sodbury R.D.C. Erection of 26 houses at Naishcombe Hill and 17 at Yate Aerodrome. Surveyor, Council Offices, Chipping Sodbury.

Stafford. R. E. Hawkins, Lloyds Bank Chambers, Market Sq., Cannock, is architect for factory in Common Rd. for Enode Ltd. Approval sought by R.D.C. for erection of 411 dwellings at Hixon and Gnosall.

Whitefield (Lancs). Work expected to start this year on £128,995 secondary school. Approval has been granted.

NEW COMPANIES

Extracted from the Register issued by Jordan and Sons, Ltd., 116 Chancery Lane, London, W.C.2.

J. Clubley Armstrong Danarm Ltd., Abford House, Wilton Rd., Westminster, S.W.1. Mechanical, electrical, civil and consulting engineers, manufacturers and designers of and dealers in saws, handsaws, motor and electric saws, etc. Cap.: £25,000. Dirs.: to be appointed by subs. Subs.: D. F. Billins, 2 Littlejohn Rd., Orpington, Kent; and N. Dale, 131 Repton Rd., Orpington.

David Roberts and Co. (Engineers), Ltd. To enter into an agreement with Herbert D. Roberts, mechanical and constructional engineers, electrical, buildings and civil engineers and public works contractors, etc. Cap.: £5,000. Dir.: H. D. Roberts.

Electronic Laminations Ltd., 162a Sloane St., S.W.1. Manufacturers of and dealers in electronic and electrical laminations and components, etc. Cap.: £100. Dirs.: W. V. S. Sinclair, S. E. Innes, D. G. C. Trench and P. Emmet-Love.

Electronics (Westcliff-on-Sea) Ltd., 8 Weston Chambers, Weston Rd., Southend-on-Sea. Manufacturers of and dealers in electrical and mechanical apparatus of all kinds, etc. Cap.: £1,000. Dirs.: Mrs. L. G. Cousin and N. V. Snelling.

Four Cousins (Electrical Contractors) Ltd., Royal Liver Bldg., Liverpool. Cap.: £100. Dirs.: Sir W. N. Cayzer, Bt., Hon. H. R. Cayzer, B. G. S. Cayzer and Hon. M. A. R. Cayzer.

Highbury Tankers Ltd., 24, 25 and 25a, Charterhouse Chambers, Charterhouse Sq., E.C.1. Motor, mechanical, electrical and general engineers and engineering contractors, machinists, smiths, etc. Cap.: £500. Dirs.: J. H. Sparshatt and S. G. Chalker.

Knee and Crowe (Refrigeration) Ltd., Bank Bldgs., 325 Bloomsbury St., Nechells Green, Birmingham. Manufacturers of and dealers in refrigerators, milk coolers, sterilisers, etc. Cap.: £1,500. Dirs.: L. G. Knee and C. L. Crowe.

MEETINGS TO NOTE

THURSDAY, SEPT. 3

A.S.E.E. (S. London Branch).—"Mineral Insulated Cables." G. E. D. Redman. Café Royal, Croydon, 8 p.m.

FRIDAY, SEPT. 4

SOUTHAMPTON ELECTRIC CLUB. Meeting at Polygon Hotel, 7 p.m.

A.S.E.E. (Liverpool Branch).—Chairman's address by George Jelley. Engineering Society, 9 The Temple, 24 Dale St., 7.30 p.m.

MONDAY, SEPT. 14.

E.I.B.A.—Inaugural meeting of new branch to cover N. Metropolitan area at Eastern Board, Station Rd., Wood Green, 2.30 p.m.

EXHIBITION DIARY

Radio and Television. 20th Show at Earls Court opened on Sept. 1 and closes on Sept. 12.

Engineering, Marine and Welding. 19th Show opens at Olympia to-day and continues until Sept. 17.

Electro Medical. This exhibition and the first International Congress of Physical Therapy opens at Central Hall, Westminster, on Sept. 7. It closes on Sept. 11.

Welsh Industries Fair. Will take place at Sophia Gdns., Cardiff, between Sept. 9 and 19.

Nursing. 38th Annual Exhbn. opens at Seymour Hall, London W.1, on Oct. 12 and closes on Oct. 16.

OLDHAM AND SON LTD.

New Applications for Storage Batteries

THE 34th annual general meeting of Oldham and Son Ltd., was held on August 27 at Denton, Manchester, Mr. John Oldham, O.B.E., J.P. (the chairman), presiding.

In his statement circulated with the accounts the chairman reported a net profit for the year of £262,541 compared with £319,706 for the previous year. After provision for taxation there was a balance of £109,247. A final dividend of 10% on the Ordinary Shares was proposed, which together with the interim dividend paid made a total distribution on the Ordinary Shares of 17½%.

During the year the Ordinary Share Capital was doubled by a share issue of £200,000 from reserves. Thus the amount of the dividend (last year expressed as 35%) is unchanged.

The Importance of Research

In the course of his speech, Mr. Oldham said : *Important though automobile batteries are as part of our activities, we must remember also the increasing contribution which is being made by storage batteries, of the type manufactured by your Company, to a great variety of other activities of this modern world.* Oldham equipment is applied to a host of purposes, from lighting the marker buoys of fishermen's nets to providing illumination for the miner underground.

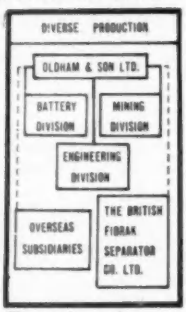
Of particular interest are our outlets to many branches of Industry—not only for their immediate value as markets, but because there seems to be no limit to Industry's capacity for devising new equipment to whose operation storage batteries are essential. Whilst many static devices can draw their power from the normal electric supplies, those whose value depends on their mobility must in the nature of things be self-contained.

On the mines lighting side of the business, development and extension of intensive machine mining makes increasing demands for improved lighting equipment.

The Company's ability to cater for the changing requirements of Industry has been further expanded during the year by extensions to the Research and Technical Development Section.

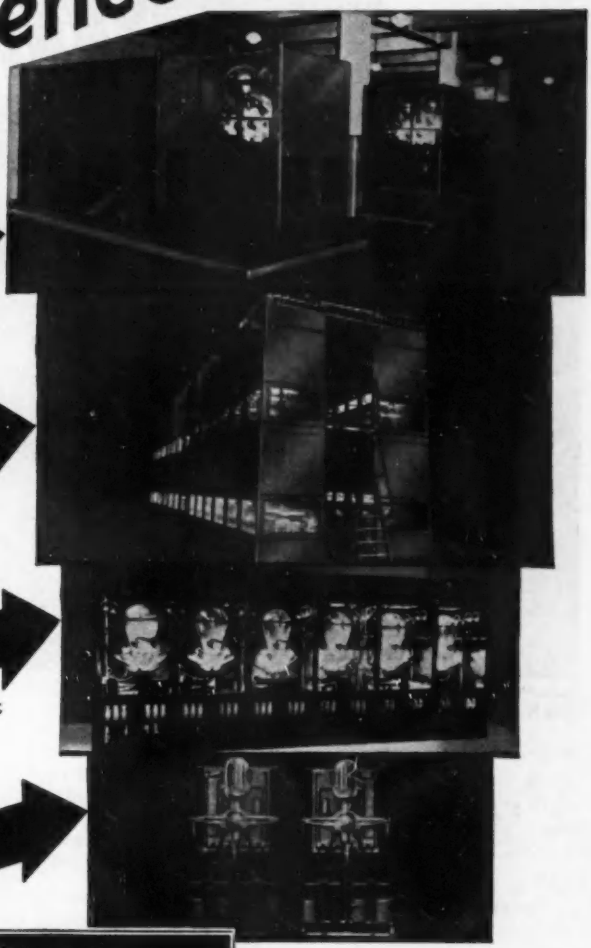
In my last report I said that large-scale Fibrak production had commenced. Since that time all Oldham automobile and passenger transport batteries have been changed over to employ the new Fibrak form of insulation.

Plans to extend the sale and manufacture of Fibrak battery separators throughout the world are proceeding.



The year's results underline the value of the Company's policy of diversifying its production and development overseas

Experience over 47 years



1952

Four 1500 kW. Hewittic Rectifiers for heavy traction service (British Columbia Electric Co.)

1940

Hewittic Rectifier, 8750 kW. in electrolytic service.

1932

1000 kW. 600 volt Hewittic traction Rectifier.

1905

Hewittic Rectifiers

over 1¼ Million kW. in World-wide service

HACKBRIDGE AND HEWITTIC ELECTRIC CO., LIMITED
WALTON-ON-THAMES · SURREY · ENGLAND
Telephone: Walton-on-Thames 760 (8 lines) Telegrams: "Electric, Walton-on-Thames"

CONDUIT & FITTINGS SUPPLIED BY

METALLIC

Oswin House, Bradford.
Photo by courtesy of Stroud Riley & Co., Ltd.

Electrical Contractors for this important installation:
A. R. Farrar & Co. Ltd.

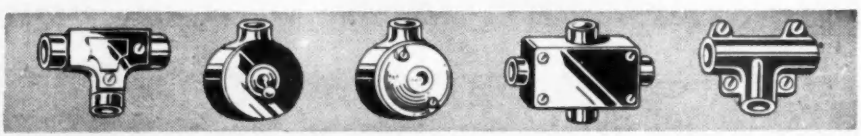
A TI COMPANY

It may be a school, it may be a factory—a power station or a housing estate, but more often than not the electrical specification will be—METALLIC.

This Yorkshire building is no exception, being fitted throughout with METALLIC conduit and fittings—unequalled for quality and consistent accuracy.

THE METALLIC SEAMLESS TUBE CO. LTD.

LUDGATE HILL · BIRMINGHAM · 3



ALSO AT LONDON · NEWCASTLE-ON-TYNE · LEEDS · SWANSEA & GLASGOW

CLASSIFIED ADVERTISEMENTS

OFFICIAL TENDERS AND APPOINTMENTS

WORK WANTED WANTED · FOR SALE

Those wishing to advertise in these pages should send the text to the Classified Advertisement Dept., Electrical Times, Sardinia House, Sardinia Street, London W.C.2, before 10 a.m. on TUESDAY of week of issue. Official Displayed Advertisements are charged at 42s. per inch, and all other classified advertisements at 3s. per line. Situations Wanted will be published four times for twice the single insertion rate. Fee for Box No. and postage on replies is 2s.

TENDERS INVITED

COUNTY BOROUGH OF SWANSEA

PORTMEAD (CADLE) HOUSING ESTATE
82 Traditional Houses
TENDERS FOR ELECTRICAL INSTALLATION

ELECTRICAL ENGINEERS wishing to tender for the Electrical Installation for 82 traditional houses at Portmead (Cadle) Estate, are invited to submit applications to the Borough Architect, The Guildhall, Swansea, on or before September 14, 1953. Plans, specifications and conditions of contract will be forwarded on application and deposit of Two Pounds, provided applicant gives satisfactory evidence of having previously carried out work of a similar character. The deposit will be refunded after delivery of a bona-fide tender (not subsequently withdrawn) and the return of all documents. The lowest or any other tender will not necessarily be accepted.

T. B. BOWEN,
Town Clerk.

The Guildhall,
Swansea.
August 22, 1953. (F 37)

HAVERFORDWEST BOROUGH COUNCIL

GROUP "A" LIGHTING SCHEME

TENDERS are invited for the supply and erection of 60 high pressure MERCURY VAPOUR LAMPS on reinforced concrete and steel columns and wall brackets, on Trunk Roads A.40 and A.4076 within the borough, for a total distance of approximately 1¼ miles.

Form of tender, specification and bill of quantities may be obtained from the Borough Surveyor, 9 Victoria Place, Haverfordwest on receipt of a deposit of 2 guineas, which will be returned on receipt of a bona fide tender.

Plans and conditions of contract may be inspected at the Borough Surveyor's Office during normal office hours.

Tenders sealed in the envelope provided endorsed "Group A Lighting" are to be delivered to the undersigned not later than 12 noon on Monday, September 21, 1953.

R. IVOR REES,
Town Clerk.

9 Victoria Place
Haverfordwest. (F 38)

COUNTY BOROUGH OF SWANSEA

Swansea Swimming Baths, St. Helen's Road.
TENDERS FOR ELECTRICAL INSTALLATION

ELECTRICAL ENGINEERS wishing to tender for the Electrical Installation for Swansea Swimming Baths, St. Helen's Road, are invited to apply to the Borough Architect, The Guildhall, Swansea, on or before September 23, 1953, for plans, specifications and conditions of contract. These will be supplied upon payment of a deposit of £2, provided the applicant gives satisfactory evidence of having previously carried out work of a similar character. The deposit will be refunded after delivery of a bona-fide tender (not subsequently withdrawn) and the return of all documents. The lowest or any other tender will not necessarily be accepted.

T. B. BOWEN,
Town Clerk.

The Guildhall,
Swansea.
August 25, 1953. (F 39)

Engagement of persons must be made through a Local Labour Office or Scheduled Employment Agency, if the applicant is a man aged 18-64, or a woman aged 18-59; unless the person concerned is excepted or the employment is in a managerial or professional capacity, or is otherwise excepted from the provisions of the Notification of Vacancies Order, 1952.

APPOINTMENTS VACANT

SOUTH WEST SCOTLAND ELECTRICITY BOARD

Dumfries and Galloway Sub-Area

APPLICATIONS are invited for the appointment of a DISTRICT COMMERCIAL ENGINEER in the Annan District of the Sub-Area. Salary and conditions in accordance with the National Joint Board Agreement, Class "D," Grade 3, £813 to £943 per annum.

Applicants should preferaly be Corporate Members of the Institution of Electrical Engineers or possess equivalent qualifications, and have experience in the utilisation of electrical energy in Industrial, Commercial, Domestic and Agricultural premises, a knowledge of installation work, and be conversant with tariffs, sales and all aspects of service to consumers.

Application forms, which may be obtained from the undersigned or any other Sub-Area Manager, should be returned to this office not later than Monday, September 21, 1953.

W. H. WILLS,
Manager.

Marchmount, Dumfries.
August 29, 1953. (F 72)

SOUTH WALES ELECTRICITY BOARD

REQUIRED, two SENIOR ASSISTANTS at a Training Centre to be established at Cardiff or Newport to cover basic training of apprentices and refresher courses to others.

Duties will include the instruction of apprentices in the use of hand tools and small machine tools and in the elementary principles and practice necessary to facilitate the practical application of the standard courses of technical colleges in electricity and magnetism, mechanics and draughtsmanship.

The salaries for the respective positions will be:—
1st, Grade 6, £700 to £775.
2nd, Grade 5, £640 to £700.

These salaries are in accordance with the N.J.B. schedule for the electricity industry.

Applications stating age, present position, present salary, qualifications and experience, together with the names and addresses of three referees, should be addressed to the Secretary (Establishments), St. Mellons, to reach him not later than September 21, 1953.

D. G. DODDS,
Secretary.

Secretary's Office,
St. Mellons,
Cardiff. (F 44)

BRITISH ELECTRICITY AUTHORITY

Midlands Division

APPLICATIONS are invited for the following positions in the Generation Operation Department. N.J.B. service conditions, superannuable appointments, salaries within Schedule A of the agreement:—

(a) SHIFT CHARGE ENGINEER at Nechells "A" generating station, Class "F," Grade 7, commencing at £697 per annum.

(b) ASSISTANT SHIFT CHARGE ENGINEER at Walsall generating station, Class "G," Grade 9, commencing at £641 per annum.

(c) STATION SHIFT CONTROL ENGINEER at Hams Hall "B" generating station, Class "K," Grade 10, commencing at £719 per annum.

Applicants should have received a thorough technical training and a wide experience for (a) and (b), of the operation of H.P. boilers and turbines and E.H.T. switchgear, and for (b) in the control and operation of H.P. steam generating plant and main switchgear. Appropriate technical qualifications an advantage.

Apply, on forms available from the Establishments officer, 53 Wake Green Road, Moseley, Birmingham 13, or on Form AE6, by September 19, 1953. (F 70)

BRITISH ELECTRICITY AUTHORITY

East Midlands Division

APPLICATIONS are invited for the following positions within the Division.

CIVIL ENGINEERING DRAUGHTSMEN
Construction Department. Vacancy No. 22/53

Candidates should have experience in design and detail of reinforced concrete structures, piled and slab foundations for heavy plant, culverts, cable subways, etc., for general building construction drainage and sanitation schemes, associated with office and administrative buildings.

The salary will be in accordance with Grade 5 (£567-£671 per annum), or Grade 6 (£433-£567 per annum) of Schedule "D" of the National Joint Board Agreement.

ENGINEERING DRAUGHTSMEN (MECHANICAL)
Construction Department. Vacancy No. 44/53

Senior Draughtsmen are required in the Mechanical Section of the Construction Department at North Wilford Power Station. Candidates should have experience in one or more of the following:

(i) Design and layout of Power Station equipment, including Turbo-alternators, boiler plant, coal and ash plant, and general station auxiliaries.
(ii) H.p. and l.p. steam and feed pipework. Condensing plant and feed heating systems.
(iii) Conveyor plant, coal handling systems and material handling of station auxiliary equipment.

Salary and conditions of service will be in accordance with the National Joint Board Agreement, Grade 5 (£567-£671 per annum) and Grade 6 (£433-£567 per annum) of Schedule "D," according to experience.

ENGINEERING DRAUGHTSMEN (ELECTRICAL)
Construction Department. Vacancy No. 61/53

Candidates should have experience in the preparation of layouts and diagrams for the installation of e.h.t. and l.t. switchgear, transformers, e.h.t. and l.t. cables; knowledge of protective gear systems would be an advantage.

The salary will be in accordance with Grade 5 (£567-£671 per annum) or Grade 6 (£433-£567 per annum) of Schedule "D" of the National Joint Board Agreement.

STATION SUPERINTENDENT
Drakelow Power Station. Vacancy No. 88/53

Applications are invited for the position of Power Station Superintendent, at Drakelow, now under construction.

Candidates must have served a recognised engineering apprenticeship and should have a wide experience in the operation, maintenance and administration of a modern p.f. power station. Corporate membership of the Institutions of Mechanical and/or Electrical Engineers will be an advantage.

The terms and conditions of service will be those approved by the National Joint Board and the salary will be in accordance with Class "J," Grade 1 (£1,316-£1,375 per annum).

The closing date for this appointment will be September 7, 1953.

SHIFT CONTROL ENGINEER
Derby Power Station. Vacancy No. 89/53

Applicants should have had a sound training and practical experience in a modern generating station. The possession of a Higher National Certificate in Electrical Engineering, its equivalent, would be advantageous.

The salary will be in accordance with Class "F," Grade 10 (£577-£598 per annum) of Schedule "A" of the National Joint Board Agreement.

The closing date for this appointment will be September 14, 1953.

STATION SHIFT CONTROL ENGINEER
Avon Power Station. Vacancy No. 90/53

Applicants should have had sound technical training and experience in the control of modern switchgear.

The salary will be in accordance with Class "E," Grade 10 (£555-£569 per annum) of the National Joint Board Agreement.

The closing date for this appointment will be September 21, 1953.

The above positions will be pensionable within the provisions of the British Electricity Authority and Area Board's Superannuation Scheme.

Applications should be submitted on the official form which may be obtained from the Divisional Establishments Officer, British Electricity Authority, Barker Gate, Nottingham, and should be returned to the undersigned by the dates stated. Please quote Vacancy Number.

L. F. JEFFREY,
Divisional Controller.
(F 71)

SOUTH EAST SCOTLAND ELECTRICITY BOARD

GENERAL ASSISTANT ENGINEER CONSTRUCTION. N.J.B. Class "G". Grade 13 for Sub Area Headquarters in Galashiels. Applicants must have had experience in layout and construction of h.v. and l.v. o/h lines and preferably in surveying.

Applications stating age, experience, present position and salary and giving two referees should be sent to the Sub Area Manager, South East Scotland Electricity Board, Galashiels, by September 12. (F 43)

BRITISH ELECTRICITY AUTHORITY

South Wales Division

Vacancy No. 68/53.

APPLICATIONS invited for superannuable N.J.B. appointment of STATION SHIFT CONTROL ENGINEER, Newport Power Station. Salary "F.10" (£577 to £598 p.a.).

H.N.C. and experience in control room of modern power station required.

Application forms obtainable from Secretary, South Wales Division, British Electricity Authority, Twyn-y-Fedwen Road, Gabalfa, Cardiff, should be returned by September 12, 1953. (F 49)

BRITISH ELECTRICITY AUTHORITY

South Wales Division

Vacancy No. 66/53.

APPLICATIONS invited for the following N.J.B. appointments in the Generation (Construction) Dept. Divisional H.Q.:

(a) SENIOR DRAUGHTSMAN. Salary "D.5" £567 to £671 p.a.).

H.N.C. and experience of design and layout of turbo-alternators, boiler plant, steam and feed pipework, conveying and coal handling systems, etc.

(b) ENGINEERING DRAUGHTSMAN. Salary "D.6" (£433 to £567 p.a.).

Knowledge of mechanical and/or electrical installations and plant layout required. Preference given to candidates with H.N.C. or equivalent.

Application forms obtainable from Secretary, South Wales Division, British Electricity Authority, Twyn-y-Fedwen Road, Gabalfa, Cardiff, to be returned by September 14, 1953. (F 47)

GOLD COAST LOCAL CIVIL SERVICE

VACANCIES exist in the Local Civil Service of the Gold Coast (Posts and Telecommunications Department) for 4 ASSISTANT ENGINEERS ENGINEERS (CDE108/13/03.

Appointments are on contract in the salary scale, £1,130-£1,530 per annum but candidates who have reached the age of 28 years and who have completed 5 years experience after obtaining the qualification stated below, would be appointed to the salary scale of £1,600-£2,020 per annum. A gratuity of £37 10s. for each completed three months satisfactory service is also payable.

Free first-class passages are provided for the officer, his wife and children up to 3 in number under the age of 13. Government quarters, if available, are provided at a rental of £75 to £90 per annum. Leave is granted at the rate of 7 days for each month of resident service after a tour of 18 to 24 months.

Candidates should be under the age of 45 and must have passed or be exempt from Sections A and B of the examination for Associate Membership of the Institution of Electrical Engineers. They should, in addition, have had a thorough training in telecommunications engineering with experience in the Engineering Department of the G.P.O. or with a manufacturing firm in the United Kingdom. Some knowledge and experience of power generation and distribution would be an advantage.

Apply in writing to the Director of Recruitment, Colonial Office, Great Smith Street, London, S.W.1, giving briefly age, qualifications and experience. Mention the reference number CDE 108/13/03. (F 95)

BRITISH ELECTRICITY AUTHORITY

London Division

APPLICATIONS are invited for the following superannuable posts. Salary, including London allowance, and conditions of service in accordance with N.J.B. Agreement, Schedule "A." Qualifications entitling to Graduate Membership of the I.E.E. or I.Mech.E. an advantage.

JUNIOR ENGINEERS
Barking "C" Generating Station

Qualifications: Practical experience of modern power station plant required for the general duties in a station. Applicants must be prepared to carry out shift duties, if required. Salary within Class "J," Grades 18/14, £427-£572 5s. p.a.

JUNIOR ENGINEERS
Fulham Generating Station

Experience of power station operation an advantage. Salary: Class "L," Grades 20/16, £429-£574 7s. p.a.

ASSISTANT ENGINEER (STATISTICS)
Bankside Generating Station

Successful candidate will be responsible for compilation of technical statistics. Salary: Class "H," Grade 14, £524 p.a.

JUNIOR ENGINEERS
West Ham Generating Station

Practical experience of power station plant. General duties in station. Salary, Class "H," Grade 17/14, £427-£541 16s. p.a.

Application may be made on form obtainable from Divisional Secretary, B.E.A., London Division, Generation House, Great Portland Street, W.1, and be received within 14 days of this advertisement. (F 67)

BRITISH ELECTRICITY AUTHORITY

Midlands Division

SENIOR DRAUGHTSMAN (Civil) is required in the Chief Generating Engineer's (Construction) Department at Wolverhampton. N.J.B. service conditions, superannuable appointment, salary within Schedule "D," Grade 5, £567 to £671 per annum.

Experience in the layout and design of heavy structural steelwork, or civil engineering and building works for generating stations, including reinforced concrete work, is required, together with appropriate technical qualifications.

Apply on forms available from the Establishments Officer, 53 Wake Green Road, Moseley, Birmingham 13, or on Form AE.6 by September 26, 1953. (F 40)

SOUTH WALES ELECTRICITY BOARD

REQUIRED, THIRD ASSISTANT (Changeover) in the Commercial Department of the Central Sub-Area of the Board at Cardiff.

Duties will entail the specifying and arranging for changeover of consumers' apparatus and equipment and negotiations with consumers.

Salary in accordance with Class "L," Grade 10 (£786-£780-£794) of the N.J.B. Schedule.

Applications stating age, present position and salary, qualifications and experience, and giving three referees, to be addressed to the Secretary to arrive by September 12, 1953.

D. G. DODDS,
Secretary.

St. Mellons,
Cardiff. (F 45)

BRITISH ELECTRICITY AUTHORITY

Midlands Division

APPLICATIONS are invited for the following positions in the Generation Construction Department at Wolverhampton:—

(a) SECOND ASSISTANT ENGINEER (ELECTRICAL)

This position involves the development of electrical schemes for auxiliary power and plant, preparation of specifications and the installation and commissioning of all electrical power station plant.

(b) THIRD ASSISTANT ENGINEER (ELECTRICAL)

This position involves assistance in the development of schemes and specifications for electrical plant outlined above, and the supervision of the installation and commissioning of all power station electrical plant.

Applicants should have served a recognised apprenticeship and should preferably possess appropriate technical qualifications. Experience at an electrical plant manufacturer's works and/or in the construction of a modern power station necessary.

Salaries within Schedule C of the N.J.B. agreement, (a) Grade 2 commencing in range £834 to £970, rising to £1,053, and (b) Grade 5 commencing in range £649 to £790 ultimately rising to £858.

Apply on forms available from the Establishments Officer, 53 Wake Green Road, Moseley, Birmingham 13, or on Form AE6, by September 19, 1953. (F 41)

BRITISH ELECTRICITY AUTHORITY

South Eastern Division

OPERATION DEPARTMENT at Divisional Headquarters—JUNIOR ENGINEER. This position is in the Generation, Economics and Methods Section of the department and applicants should preferably have a knowledge of power station plant. Ordinary National Certificate would be an advantage. Class "AX," Grade 9, commencing at £415 per annum.

Construction Department at Divisional Headquarters —ENGINEERING DRAUGHTSMAN (CIVIL). Applicants should preferably have Higher National Certificate or equivalent qualification and have had experience in the design of reinforced concrete and steel structures, foundations and power station layout and construction. Schedule "D," Grade 6, commencing at £458 per annum.

Croydon "A" Power Station. STATION SHIFT CONTROL ENGINEER. Applicants, who should preferably possess Higher National Certificate in Electrical Engineering, must have had experience in the operation and control of turbo-generators and in control room duties connected with inter-connected generating systems and e.h.t. feeder network. Class "F," Grade 10, £605 17s. per annum.

Croydon "B" Power Station. ASSISTANT ENGINEER (HANDLING). Applicants who should possess a knowledge of coal storage and its associated problems will be responsible for the operation of the coal and ash handling plant and associated equipment, including mobile equipment. Experience in the control of labour is essential. Class "J," Grade 12, £625 16s. per annum.

National Joint Board Conditions of Service. Salaries quoted include London allowance. Applications, giving details of education, present position, experience, etc., should be received by either the Establishments Officer, British Electricity House, Lower Ham Road, Kingston-upon-Thames, Surrey, or Station Superintendent, Croydon Power Station, Beddington Farm Lane, Croydon, Surrey (according to the location of the position) not later than September 14. (F 65)

YORKSHIRE ELECTRICITY BOARD

APPLICATIONS are invited for the following appointments:—

No. 1 (Bradford) Sub-Area

Bradford District

GENERAL ASSISTANT DISTRICT ENGINEER

Applicants should have passed the Graduateship Examination of the Institution of Electrical Engineers or hold equivalent technical qualifications; they should have experience in construction, operation and maintenance of high voltage systems, underground cables, overhead lines and substations, and medium and low voltage networks.

Candidates must be prepared to reside within the District and undertake standby duties, if required.

Salary, N.J.B., Class "H," Grade 11, £607 to £628 per annum.

Keighley District

GENERAL ASSISTANT DISTRICT ENGINEER

Applicants should have passed the Graduate Membership Examination of the Institution of Electrical Engineers or hold other acceptable technical qualifications; they should have experience in construction operation and maintenance of complete high and medium voltage overhead and underground distribution systems.

Candidates must be prepared to reside within the District and undertake standby duties, if required.

Salary, N.J.B., Class "E," Grade 11, £524 to £540 per annum.

Applications, giving full details of age, qualifications and experience, should be forwarded to the Manager, No. 1 (Bradford) Sub-Area, Yorkshire Electricity Board, 45-53 Sunbridge Road, Bradford, not later than September 17, 1953.

No. 5 (Wakefield) Sub-Area

Castleford District

ASSISTANT INSTALLATION ENGINEER

Applicants must have had a sound technical education and practical experience in electrical contracting work of all types.

They should be capable of preparing and supervising schemes for all classes of domestic, commercial and industrial installations, including specifications, estimates and tenders.

Experience in electrical appliance repairs would be considered an advantage.

Applicants should have had considerable experience in the control of workmen.

Salary, N.J.B., Class "E," Grade 10, £555 to £569 per annum.

Applications, giving full details of age, qualifications and experience should be forwarded to the Manager, No. 5 (Wakefield) Sub-Area, Yorkshire Electricity Board, 1a Denby Dale Road, Wakefield, not later than September 17, 1953.

No. 4 (Leeds) Sub-Area

Wetherby District

GENERAL ASSISTANT DISTRICT ENGINEER

Applicants should possess good general and technical education and training, and have had experience in the construction, operation and maintenance of E.H.T. and L.T. overhead and underground distribution systems, in a mixed Urban and Rural District.

Candidates must be prepared to reside in the District.

Salary, N.J.B., Class "E," Grade 11, £524 to £540 per annum.

Applications, giving full details of age, qualifications and experience, should be forwarded to the Manager No. 4 (Leeds) Sub-Area, Yorkshire Electricity Board, Bramhope, Leeds, not later than September 17, 1953.

No. 7 (Grimsby) Sub-Area

ASSISTANT (WAYLEAVES)

Applicants will be required to negotiate Wayleave Consents with Land Owners and Tenants and with Statutory Bodies and Local Authorities. Some knowledge of present-day rural conditions will be an advantage.

Salary, N.J.B., Grade 2, £460 to £520 per annum.

Applications, giving full details of age, qualifications and experience, should be forwarded to the Manager No. 7 (Grimsby) Sub-Area, Yorkshire Electricity Board, Moss Road, Grimsby, not later than September 17, 1953. (F 42)

BRITISH ELECTRICITY AUTHORITY

South Western Division

BOILER HOUSE SHIFT CHARGE ENGINEER required at Portishead "A" Generating Station.

Superannuation Scheme. Salary, N.J.B. Class "J," Grade 9, £719 to £750 per annum.

Applicants should have had good technical experience preferably in a generating station, and also a thorough practical theoretical training in mechanical engineering.

Applications, on Form A.E.6/ACT, obtainable from the Divisional Secretary, 26 Oakfield Road, Bristol 8, should be completed and returned by September 12, 1953. (F 73)

NOTTINGHAM AND DISTRICT TECHNICAL COLLEGE

Principal: H. Baker, Ph.D., A.M.I.C.E., A.M.I.Mech.E.

APPLICATIONS are invited for the post of LECTURER IN ELECTRICAL ENGINEERING. The person appointed will be required to teach electrical engineering subjects to H.N.C. and Final Degree level. The main subject should be electrical machines, with emphasis on utilisation and performance rather than design. The person appointed will be responsible for the organisation of a section of the department. Good laboratory facilities are provided.

Minimum qualifications are a good degree in electrical engineering and suitable responsible experience in industry.

Salary in accordance with the Burnham Scale for Lecturers (£940 by £25 to £1,040 per annum for a man).

The successful candidate will be required to commence duties on January 1, 1954.

Application forms may be obtained from the Registrar, Nottingham and District Technical College, Shakespeare Street, Nottingham, to whom they should be returned not later than September 26, 1953.

F. STEPHENSON,
Clerk to the Joint Education Committee.
(F 51)

BRITISH ELECTRICITY AUTHORITY

South West Scotland Division

SHIFT CHARGE ENGINEER
Braehead Generating Station

A Shift Charge Engineer is required at Braehead Generating Station for which the salary will be within the range £772 to £802, this being in Class "H," Grade 7, of the National Joint Board Schedule. Experience in a generating station burning pulverised fuel is essential. This position is superannuable.

Applications on Form AE6, which may be obtained from the Authority's Headquarters, or from any Divisional Office of the Authority, should be forwarded to the Divisional Secretary, 168 Broomhill Drive, Glasgow, before September 15, 1953.

A. CHRISTIANSON,
Divisional Secretary.
August 26, 1953. (F 74)

MIDLANDS ELECTRICITY BOARD

THIRD ASSISTANT DISTRICT ENGINEER required in the Evesham district of the Worcester and District Sub-Area. Experience necessary in all branches of distribution work, including construction, operation and maintenance of high and low voltage underground and overhead distribution systems. Technical qualifications desirable. Salary £587 to £600 per annum (N.J.B. Grade "E.9"), superannuable.

Apply within 14 days to Sub-Area Manager, Midlands Electricity Board, Whittington, Worcester.

A. STEPHENS,
Secretary.
(F 48)

BRITISH ELECTRICITY AUTHORITY

DRAUGHTSMEN AND SENIOR DRAUGHTSMEN

HEADQUARTERS, Bankside, London, require Draughtsmen, Grade 6, with suitable experience for work on one of the following:

(a) Generation station layout.

(b) Foundations and Civil Works in connection with 132 kV grid sub-stations.

(c) Electrical layouts and diagrams for 132 kV grid sub-stations.

There are also vacancies for:

Senior Draughtsmen, Grades 4 and 5, for (a) and Grade 5 for (b).

Starting salaries will be within the following N.J.B. grades according to qualifications and experience. Grade 4, £705-£819, Grade 5, £595-£705, Grade 6, £458-£595 inclusive. Pension scheme. One Saturday morning in four on duty. Forms from D. Moffat, Director of Establishments, Winsley Street, W.1. Quote Reference E.T./417. (F 66)

BRITISH ELECTRICITY AUTHORITY

Southern Division

APPLICATIONS are invited for the following position:
THIRD ASSISTANT ENGINEER (MECHANICAL)
S/13. 432
Construction Department

Applicants should preferably be corporate members of a recognised professional institution or hold qualifications leading to corporate membership. Manufacturing works experience and practical experience in the mechanical aspects of power station design and construction are necessary. The successful applicant will be stationed at Cowes Generating Station site.

Salary—N.J.B., Grade 5, Class "AX/CX," £649 to £835.

Special application forms, obtainable from F. D. A. Oliver, Esq., Divisional Secretary, 111 High Street, Portsmouth, should be returned by September 16, 1953. (F 76)

BRITISH ELECTRICITY AUTHORITY

Eastern Division

APPLICATIONS are invited for the following post:—
STATION SHIFT CONTROL ENGINEER
Little Barford Generating Station

Salary—Class "G," Grade 10, £608 to £630 per annum.

Applicants should have reached the standard of Ordinary National Certificate in Electrical Engineering or its equivalent, have experience in the operation of a switchboard at a generating station and be fully conversant with high tension switching operation and protective systems.

Applications, giving details of age, qualifications, experience and present position should be submitted to the Divisional Controller, British Electricity Authority, Eastern Division, Northmet House, Southgate, N. 4, not later than September 12, 1953.

W. N. C. CLINCH,
Controller.
(F 75)

POWER STATION SUPERINTENDENT

REQUIRED by the GOVERNMENT OF FALKLAND ISLANDS for one tour of 3 years in the first instance with prospect of permanency. Salary including cost-of-living bonus, £707 rising to £807 a year. Free passages. Candidates must have a sound practical knowledge of the running and maintenance of medium speed Diesel alternator sets up to 300 h.p., of the maintenance and erection of switchgear, transformers, l.t. and medium h.t., overhead lines; and of house wiring, small factory wiring, repair of domestic apparatus, metering etc.

Write to the Crown Agents, 4 Millbank, London S.W.1. State age, name in block letters, full qualifications and experience and quote M2C 29659/EE. (F 46)

BRITISH ELECTRICITY AUTHORITY

North Western Division

VACANCY No. 194/53. ASSISTANT SHIFT CHARGE ENGINEER at Stuart Street Generating Station, Manchester. Salary £680 to £706 (H.9).

Vacancy No. 195/53. STATION SHIFT CONTROL ENGINEER, Hartshead Generating Station, Stalybridge. Salary £608 to £630 (G.10).

Vacancy No. 196/53. DEPUTY POWER STATION SUPERINTENDENT, Chadderton (L.P.) Generating Station, near Oldham. Salary £858 to £894 (E.3).

Vacancy No. 198/53. ASSISTANT SHIFT CHARGE ENGINEER, Lancaster Generating Station. Salary £607 to £629 (F.9).

Apply to Establishments Officer, British Electricity House, 825 Wilmslow Road, Manchester 20, before September 9. Quote vacancy No. (F 50)

BRITISH ELECTRICITY AUTHORITY

Midlands Division

STATION SHIFT CONTROL ENGINEER required at Nechells "B" Generating Station, Birmingham. N.J.B. service conditions, superannuable appointment. Salary within Schedule "A." Grade J10, commencing at £680 per annum.

A sound technical training and practical experience in the control and operation of h.p. steam generating plant and main switchgear required, and preferably suitable technical qualifications.

Apply on forms available from the Establishments Officer, 53 Wake Green Road, Moseley, Birmingham 13, or on Form AE6, by September 19, 1953. (F 68)

BRITISH ELECTRICITY AUTHORITY

Midlands Division

ASSISTANT ENGINEER (HANDLING) required at Stourport "A" and "B" generating stations. N.J.B. service conditions, superannuable appointment, salary within Schedule A, Grade J.12, commencing at £596 per annum.

Duties will consist of the supervision and control of all coal deliveries and traffic, the movement of coal to bunkers, ash disposal, and the maintenance of sidings on the site; also the maintenance of coal and ash records.

Apply, on forms available from the Establishments Officer, 53 Wake Green Road, Moseley, Birmingham 13, or on Form AE6, by September 19, 1953. (F 69)

ASSISTANT MECHANICAL MAINTENANCE ENGINEER required for organisation in East London district operating large electrical station. Applicants should have wide and up-to-date experience in the maintenance of modern generating station power plant and be capable of supervising turbine and boiler overhauls. Technical qualifications should be sound. Age not less than 32 or over 45. Commencing salary approximately £950 per annum with non-contributory pension. Position has excellent prospects.—Reply to Box No. 2889, Electrical Times, quoting reference TME/7. (F 52)

ASSISTANT TEST ENGINEER for high voltage testing work. Technical education to at least Ordinary National Certificate standard. Previous electrical testing experience necessary.—Write for interview, giving training and experience to the Assistant Secretary, The Micanite and Insulators Co., Ltd., Empire Works, Blackhorse Lane, London E.17. (F 53)

ASSISTANTS are required by The Benjamin Electric Ltd., Brantwood Road, Tottenham, N.17, in their Engineering and Research Department. Applicants should preferably be 25 to 30 years of age, with education to Higher National Standard. Experience in one or more of the following categories especially useful:—

(a) Physics or electronics—for problems associated with gear for discharge lamps.
(b) Electrical engineering—for investigation of electrical, optical and thermal properties of lighting fittings.
(c) Mechanical engineering and manufacturing processes—for the design of lighting fittings.

Apply by letter, giving full details of age, training and experience, with salary required, for attention of Chief Technical Engineer. (F 77)

BRITISH ELECTRICITY AUTHORITY (Yorkshire Division) require a GENERATION ENGINEER (OPERATION). Candidates should preferably be Corporate Members of one or more of the recognised engineering institutions and be familiar with the operation of modern h.p. plant. The salary will be within the provisional salary range £1,325 to £1,800 p.a. Applications stating age, present position and salary, and giving full details of qualifications and experience to D. Moffat, Director of Establishments, British Electricity Authority, Winsley Street, London W.1, by September 19, 1953. Quote Ref. AE 416. (F 54)

CHIEF ENGINEER required by firm of switchgear manufacturers in North London, to take charge of design and development of l.t. switchgear. Must have held similar position and have had considerable experience on the development of air and oil circuit-breakers, fusegear and l.t. distribution systems.—Applications, giving full particulars, including salary required, to Box No. 2855, Electrical Times. (F 29)

DRAUGHTSMAN required, experience in paper mill work and chemical plant layout an advantage, but not essential. Permanent position. Pension scheme. State experience and salary required.—Apply Labour Officer, Star Paper Mills, Ltd., Feniscowles, near Blackburn. Tel.: Pleasington 191. (F 55)

ELECTRICAL (BTH-trained man preferred) OR MECHANICAL ENGINEER SALESMAN required for the Far East. Should hold Higher National Certificate or Engineering Degree. Bachelor, not over 25. Salary according to experience, plus cost-of-living allowance; passage and furnished accommodation provided; Provident Fund; Pension Scheme.—Apply, Staff Secretary, The Borneo Company, Ltd., 143/149 Fenchurch Street, London E.C.3. (F 80)

ELECTRICAL DESIGNER DRAUGHTSMAN required in London for lighting and power installations in large buildings. Knowledge of department stores an asset. Salary £550 to £650 p.a.—Full details of experience, technical qualifications and age, to Box ET 585, LPE, 110 St. Martin's Lane, London W.C.2. (F 78)

ELECTRICAL DRAUGHTSMAN (male) required for drawing office of Carreras, Ltd. Must be fully experienced. Five-day week.—Full particulars of age, experience and training, in writing to Employment Department, Arcadia Works, Hampstead Road, N.W.1. (F 79)

ELECTRICAL ENGINEER for reputable N. Lancs. company producing high-grade laboratory apparatus. This post offers fine prospects and an immediate first-class salary.—Applicants are invited to send fullest details to Box No. 2879, Electrical Times. (F 59)

ENGINEERS, aged 25 to 40 years, required for senior and junior positions in Test and Service Department (based on London). Duties involve starting-up, efficiency testing, and service work chiefly on land water-tube boilers up to power station capacities. Experience of this or similar type of work is desirable. Applicants holding M. of T., naval watch-keeping or equivalent certificate preferred. Works apprenticeship essential. Salary from £600 to £750 per annum, according to qualifications and experience. Contributory pension scheme.—Apply in writing (only), stating age, full particulars of experience and qualifications to Foster Wheeler Ltd., 3 Ixworth Place, S.W.3. (F 58)

BOX No. replies to be addressed to the ELECTRICAL TIMES, Sardinia House, Sardinia Street, London W.C.2

ELECTRICAL ENGINEERING DRAUGHTSMAN required for Site Drawing Office in Kuwait, Persian Gulf. Applicants, not over 35 years of age, should have had power station and sub-station design experience and should be in possession of Ordinary National Certificate. The starting salary will be £875 per annum, plus a cost-of-living allowance. Married accommodation cannot be promised under 12 months.—Applications in writing, giving full details of experience should be addressed to The Secretary, Ewbank and Partners, Ltd., Engineering Consultants, 10-11 Grosvenor Place, London S.W.1. (F 56)

ELECTRICAL ENGINEER, married or single, required in Nigeria. Must have knowledge of workshop, office and private dwelling installations, also experience of armature and coil winding, and maintenance of motors, generators and switchgears. Must be able to prepare accurate wiring diagrams and submit estimates, as well as supervise work of various installations. Starting salary £850 up, depending on experience, plus allowance. Furnished accommodation provided, generous paid leave with free passages.—Please reply to Box No. 2877, Electrical Times, giving age, experience, qualifications, etc. (F 57)

ESTIMATING (SALES) CLERK (male), age 21-30 required. Good standard in maths and general education essential. Progressive, superannuation, sports Permanency for right man.—Apply, Personnel Officer, Southern United Telephone Cables, Ltd., Dagenham Dock, Essex. (F 81)

FOREMAN ELECTRICIAN, preferably with sound experience in the thermostatic field, to take control of small but important department. Must have ability to carry out development work and test new projects and prototypes.—Applicants are invited to send fullest details to Box No. 2881, Electrical Times, (F 60)

GENERAL ASSISTANT ENGINEER required in Department of Transmission Engineer. Applicants should possess Higher National Certificate in Electrical Engineering or equivalent qualification and preferably have had some works training or experience in construction of H.V. substations.

Salary scale £501 to £656 (N.J.B., Class "AX/BX.6"). Placing according to experience. Pension Scheme.

Apply in writing, by September 12, 1953, to Divisional Controller, British Electricity Authority, South East Scotland Division, British Electricity House, High Street, Portobello, Midlothian. (F 82)

IMPERIAL CHEMICAL INDUSTRIES, LTD., General Chemicals Division, invite applications for the position of SHIFT CHARGE ENGINEER in the Company's Power Department for duty in the first place in their West Bank Power Station, Widnes, which has an installed capacity of 40 MW in mixed high and low pressure plant.

Applicants, who should not be more than 35 years old, should have had a sound practical training in mechanical engineering, hold a Higher National Certificate in mechanical engineering or equivalent qualification, and should have had experience of the operation of modern high pressure water tube boilers, turbo-alternators and ancillary plant.

The commencing salary will not be less than that payable under the N.J.B. Schedule A for Class "G," Grade 7, while the maximum salary which a good man may expect to reach is considerably higher than that for the same class and grade.

The selected candidate will be required to pass a medical examination and to join the Company's Pension Fund.—Applications in writing, giving age and full particulars of education, technical qualifications, engineering training and power station experience, should be sent to the Staff Manager, Imperial Chemical Industries, Ltd., General Chemicals Division, Cunard Building, Liverpool 3, quoting reference P/6. (F 83)

JOHNSON AND PHILLIPS invite applications for the appointment of CHIEF RUBBER TECHNOLOGIST, to fill a vacancy which will shortly be created by retirement.

Applicants should hold scientific qualifications of University Degree or comparable standard, and must possess extensive experience in senior capacity of the design and manufacture of rubber and thermoplastic cables with intimate knowledge of materials and compounds. They will be expected to be thoroughly familiar with the principal British and foreign cable specifications.

The duties involve overall responsibility to the Cable Test and Research Manager for all routine technical work relating to rubber cables and materials and for research and development. They cover laboratory activities, supervision of factory processes and assessment of cable design and performance. Particular importance is attached to competence in dealing with customers' inquiries and other technical problems relating to installation and operating conditions for rubber cables of all types.

Applications, giving full particulars of age, education, training experience and salary required, should be sent to Employment and Welfare Manager, Victoria Way, Charlton, S.E.7, marked Rubber Technologist and will be treated with the utmost confidence. (F 85)

Engagement of persons must be made through a Local Labour Office or Scheduled Employment Agency, if the applicant is a man aged 18-64, or a woman aged 18-59; unless the person concerned is excepted or the employment is in a managerial or professional capacity, or is otherwise excepted from the provisions of the Notification of Vacancies Order, 1952.

INSULATION ENGINEER required for London area, with B.Sc. or equivalent, for engineering and design work on electrical insulators. Starting salary £500 to £750, according to qualifications.—Please reply, with full details, to Box No. 2883, Electrical Times. (F 84)

JOINTER, for the Middle East, experienced in jointing cables up to 11 kV.—Apply, stating age and experience, with copies of testimonials, to Box No. 2885, Electrical Times. (F 86)

MAJOR OIL COMPANY requires one ELECTRICAL ENGINEERING DRAUGHTSMAN for work in London with possible visits to refineries in U.K. or abroad. Age 25 to 30 years. Candidate should possess the Ordinary National Certificate in electrical engineering or have equivalent qualification. Good practical experience required, followed by 3 to 5 years in the drawing office, on electrical installations for process plants workshops and factories.—Write, giving full details, and quoting Dept. M.2067, to Box 6464, c/o 191 Gresham House, E.C.2. (F 87)

MEDIUM-SIZED rapidly expanding electrical accessory manufacturers require enthusiastic REPRESENTATIVE for London and Home Counties. Must be car owner with established connections amongst wholesalers, Electricity Boards and large users. Good prospects with ultimate promotion to Area Manager.—Reply, giving details of salary expected, to Box No. 2845, Electrical Times. (F 25)

MONSANTO CHEMICALS, LTD., require an ELECTRICAL DRAUGHTSMAN for the Engineering Department in London. Applicants should have reached National Certificate standard and have at least two years' experience in power and lighting requirements for chemical plants. Knowledge of flameproof installations is desirable. The vacancy also requires specialised knowledge of electrical detail of industrial instruments as used in process control systems in chemical plants. Experience of electrical circuits for control instruments, remote control by means of relay or electronic equipment and automatic safety systems is desirable. Salary will be in accordance with qualifications and experience.—Applications should be made in writing to the Chief Personnel Officer, Monsanto Chemicals, Ltd., 8 Waterloo Place, London S.W.1. (F 94)

OLD-ESTABLISHED Electrical Wholesalers require REPRESENTATIVE call factories, contractors, Coventry area. Application in confidence; only experienced men considered.—Box No. 2869, Electrical Times. (F 34)

OPPORTUNITIES FOR YOUNG MEN who wish to make careers in sales/contracts engineering are available with the English Electric Co., Ltd., at their Liverpool Works. Candidates should have received practical engineering training, have completed military service and possess H.N.C. electrical or equivalent. The work is of an interesting nature, being concerned with the supply of high rupturing capacity fusegear to all types of industrial and power supply undertakings. Training would be given to suitable applicants. These positions are permanent and pensionable and offer good prospects of advancement.—Write, quoting ref. 443D, to Dept. C.P.S., 336-7 Strand, W.C.2. (F 27)

STATION ENGINEERS AND STATION ENGINEERS (MECH.) required by Air Ministry at R.A.F. and M.C.A. stations. Minimum qualifications and experience: (a) Ordinary National Certificate in either electrical or mechanical engineering as appropriate or equivalent standard of technical education; (b) recognised apprenticeship in either electrical and/or mechanical engineering; (c) three years' responsible engineering employment preferably on operation and maintenance of mine, factory or workshop plant and services; (d) supervisory experience an advantage. Duties entirely supervisory and consist of installation, operation and maintenance of high and medium voltage distribution systems, electrical installations, general plant, boiler house, i.e. engines, steam and hot water heating systems and miscellaneous works plant, tools and services, as appropriate to class of station engineer. Commencing salary according to age (normally £550 at age 28 or over), qualifications and experience on range £506 to £628, London. Provincial rates somewhat lower. Appointments include liability for service overseas for which special allowance payable in addition to salary. Appointments non-pensionable. Only natural-born British subjects.

Write, giving age full details of qualifications and experience to London Appointments Office, 1-6 Tavistock Square, W.C.1. Reference E.A.595, by September 18. Only candidates selected for interview will be notified. No original testimonials should be sent. (F 61)

SENIOR INSPECTOR of Higher National Certificate standard with experience of f.h.p. motors and A.I.D. procedure required by Frigidaire.—Apply fully, by letter, to Personnel, Frigidaire, Stag Lane, N.W.9. (F 31)

APPOINTMENTS WANTED

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ELECTRICAL ENGINEER requires position with progressive contractor as Manager Engineer, estimating, supervision, inquiries followed through to invoicing, control of staff.—Box No. 2859, Electrical Times. (F 32)

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WANTED. Large quantity of 4-in. outside diameter TUBES from the dismantling of old Babcock water-tube boilers. Best prices paid. Prepared to purchase Babcock and Wilcox water-tube boilers for dismantling.—Apply, giving full details, to Midland Iron and Hardware Co., Cradley Heath, Staffs. (F 2)

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WANTED Second-hand STAGE LIGHTING EQUIPMENT in good condition.—Write particulars to Edward Wright and Son, 43 Castle Street, Dover. (F 89)

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FOR SALE, "Atlas" vertical five-cylinder DIESEL ENGINE, 725 b.h.p., 250 r.p.m., by British Polar Engines, Ltd. No. E.162, coupled to a 600 kVA 250 r.p.m. alternator (ASEA) type G166, 440 V 3-phase 50-cycles, 787 amps continuous rated.—London Brick Co., Ltd., Africa House, Kingsway, London W.C.2. (F 62)

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TWO DYNAMOS (21in. driving wheels) in good condition. One overhauled two years ago and since not used. Capable of charging 110/150 amps. Were used in conjunction with a 28 h.p. Ruston Hornsby Diesel engine. Also large complete switchboard and small charging board.—Box No. 2867, Electrical Times. (F 92)

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6	3	2,880	SC8
3	4	1,430	SC10
12	5	1,430	SC10
13	7½	1,430	SC11
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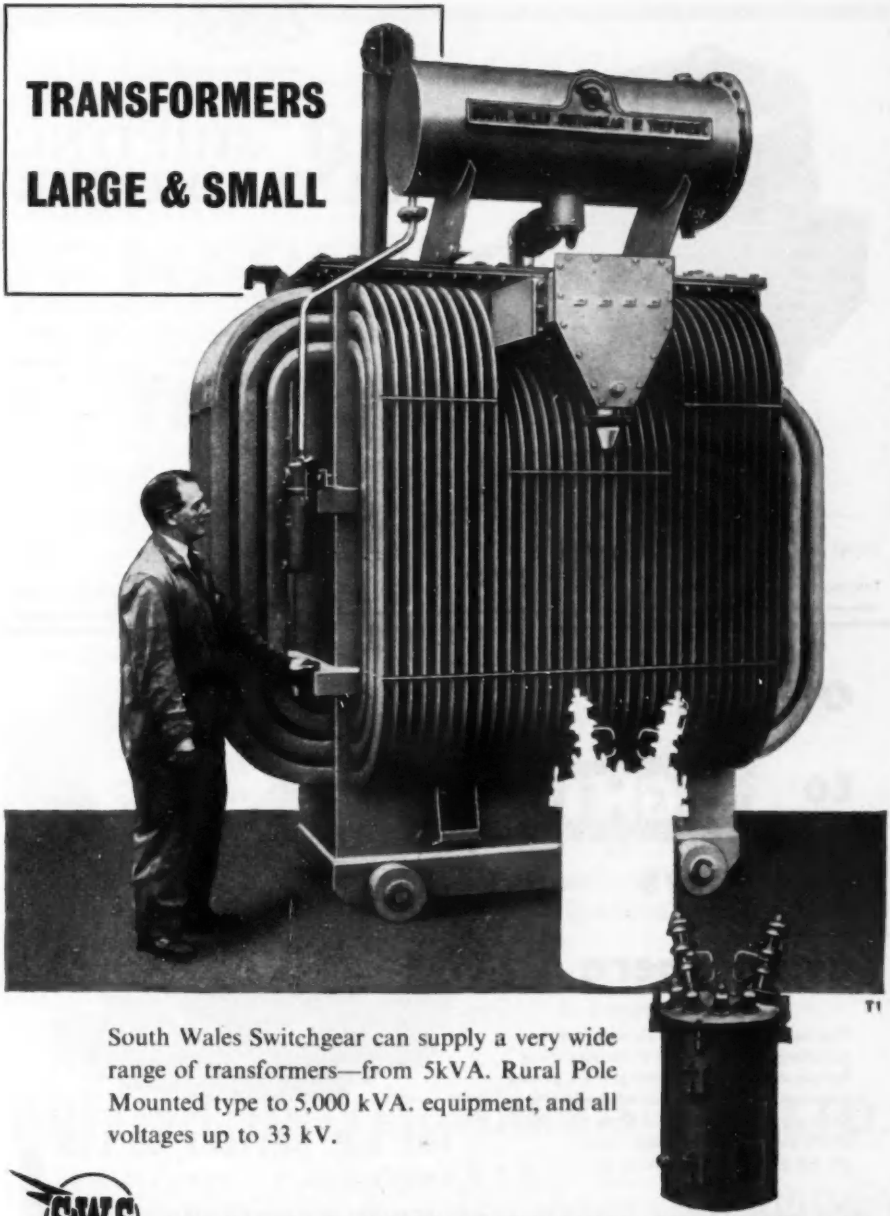

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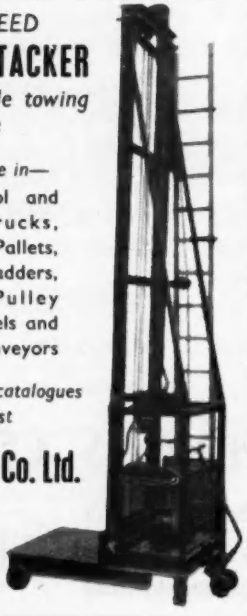

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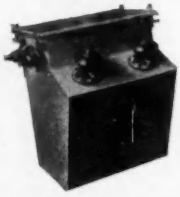

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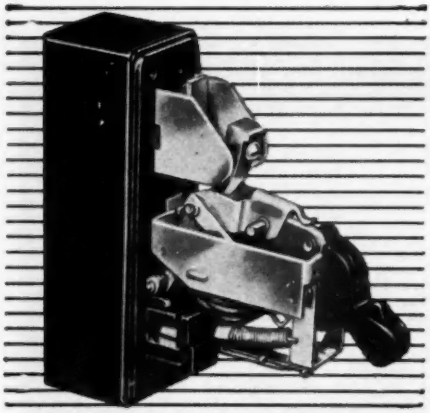

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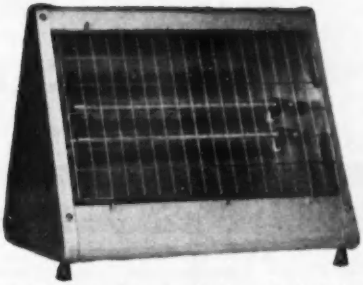

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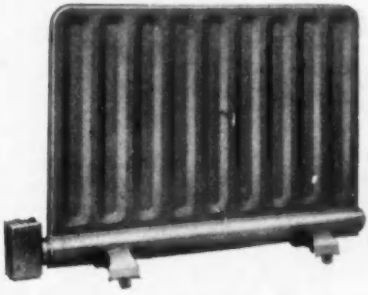

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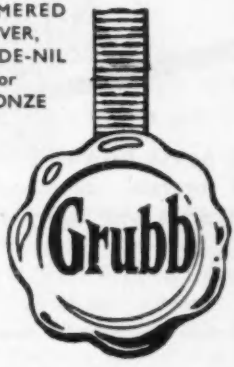

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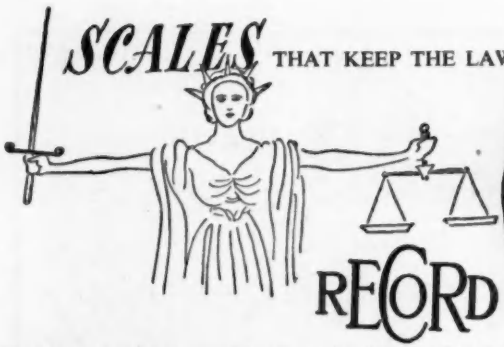

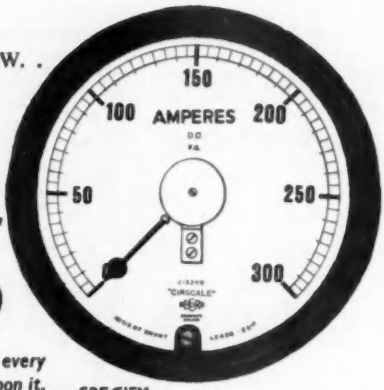

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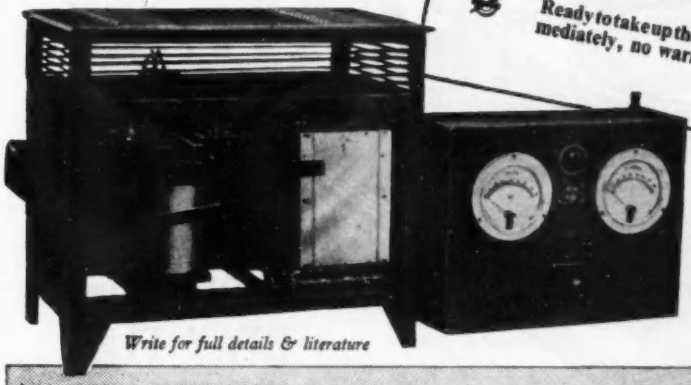

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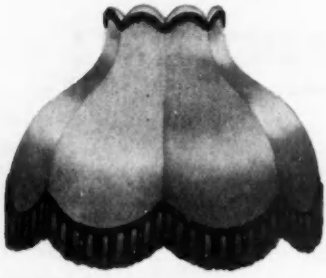

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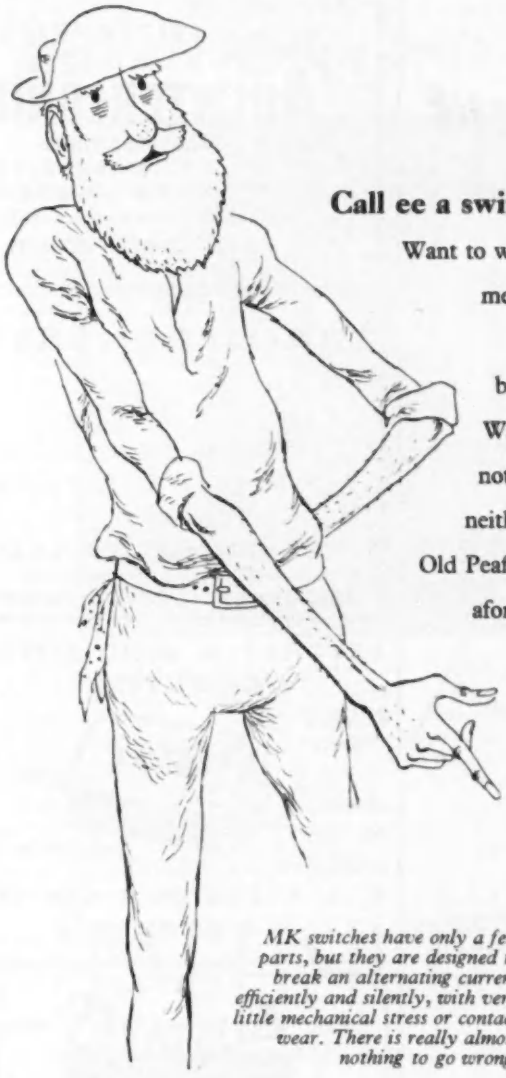

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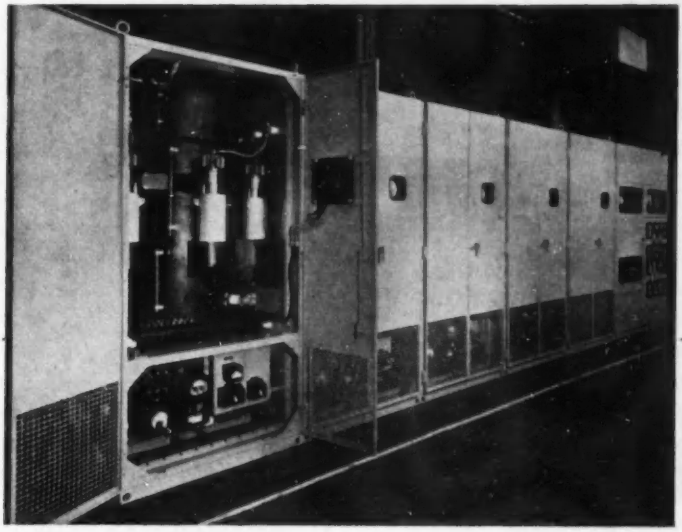

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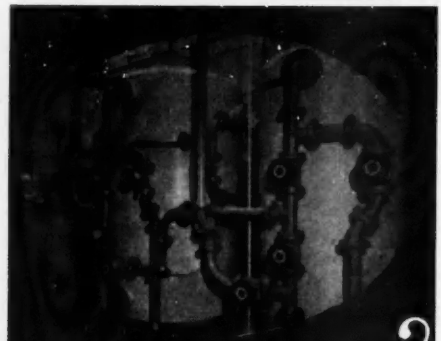

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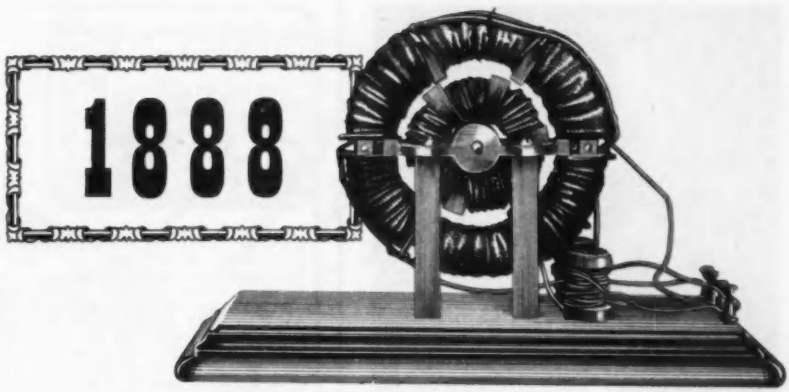

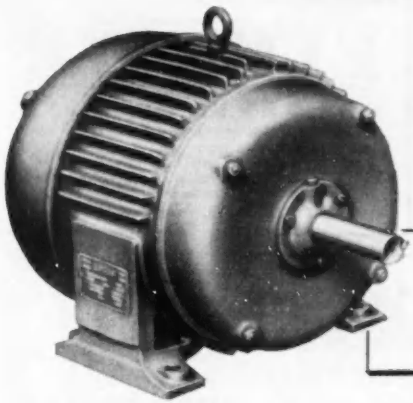

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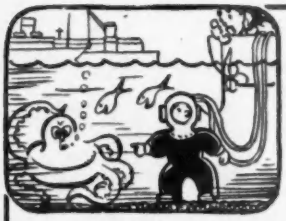

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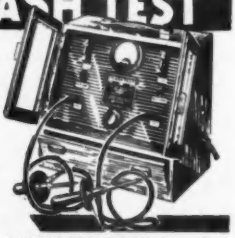

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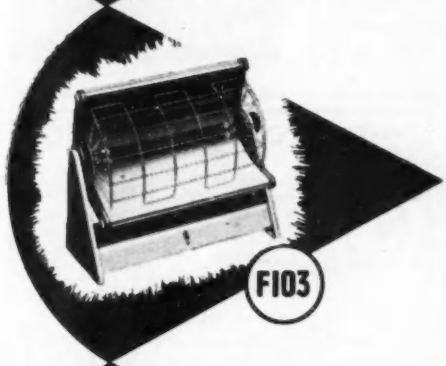

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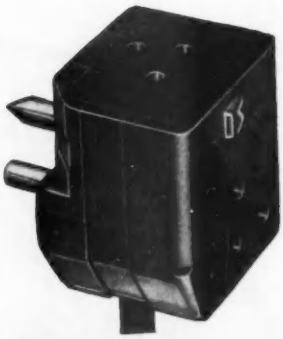

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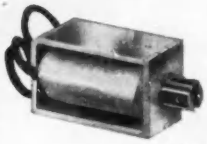

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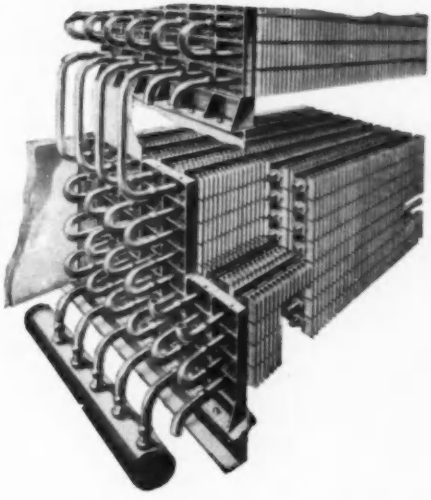

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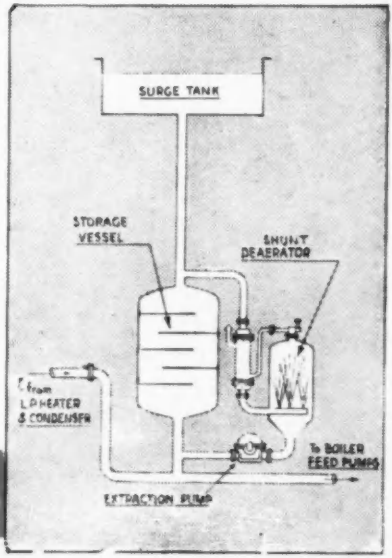

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